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ABSTRACT

Trends and new approaches to aid those engaged in planning facilities and equipment for vocational education programs were developed during a 5-day institute. The 98 participants, representing 42 states and Puerto Rico, included state directors or supervisors, local directors, architects and facilities planners, and vocational teacher educators. The program consisted of formal presentations, reports from eight task-force groups, and field studies of facilities and equipment. The task-force groups concluded that outstanding areas needing emphasis are innovative planning, need-studies, open space planning and good educational specifications and how to produce them. Some recommendations, based on participant evaluation, were: (1) An institute dealing with fundamental facilities should be held every other year, (2) More research should be focused on the elements of facilities and equipment planning, and (3) Visual aids concerned with facility planning need to be developed. Appended are presentations by guest instructors, reports of task-force groups, evaluation form and letters, and program information. (SB)

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FINAL REPORT

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# PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

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and
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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# FOREWORD

This report is submitted in compliance with the provisions of the contract. It describes the objectives, procedures, and evaluation of the project. Included are the major presentations and reports of each of the task-force committees. Statistical summary of the major evaluative findings are included in the report.

The director desires to express appreciation to all who participated and assisted in making this institute a success.

# TABLE OF CONTENTS

| | | Page |
|---|---|---|
| FOREWORD | | ii |
| REPORT SUMMARY | | 1 |
| INTRODUCTION | | 2 |
| METHODS | | 4 |
| RESULTS AND FINDINGS | | 7 |
| CONCLUSIONS AND RECOMMENDATIONS | | 9 |
| EVALUATION OF INSTITUTE | | 11 |
| SELECTED BIBLIOGRAPHY | | 19 |
| APPENDIX A | PRESENTATIONS BY GUEST INSTRUCTORS | 20 |
| APPENDIX B | REPORTS OF TASK FORCE GROUPS | 160 |
| APPENDIX C | PROGRAM, PARTICIPANTS, AND FACULTY | 186 |
| APPENDIX D | ILLUSTRATIONS OF PLANNING PROCEDURES USED | 200 |
| APPENDIX E | INSTITUTE CEHCK AND POST-CHECK FORM | 211 |
| APPENDIX F | ILLUSTRATIONS OF PARTICIPANTS' LETTERS RELATIVE TO INSTITUTE | 219 |

# REPORT SUMMARY

Facilities and equipment for vocational education must provide bot the opportunity and the environment for learning. With expanded programs and large numbers of new institutions emerging in the near future, the Institute was appropriately timed to reach many now engaged or soon to begin PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE.

The purposes of the Institute were to identify trends, develop new approaches, and expand the knowledge of individuals engaged in planning facilities and equipment or who are in positions of leadership having responsibility for facilities and equipment. Incorporated in these purposes were the concepts of new and innovative ideas and working information relative to facilities and equipment presently in use.

Participants represented forty-two states and Puerto Rico. Many present were either state directors or supervisors. Others were local directors. Some were architects and facilities planners. Several vocational teacher educators were present.

Guest speakers were recruited from the U. S. Office of Education, colleges, technical institutes, universities, and private consulting firms. Expertise was sought and found in long-range planning, leadership in facilities planning, survey techniques and need studies, basic planning considerations, educational specifications, and various approaches to the planning process. Three guest speakers were selected who had recently experienced planning activities in connection with innovative, vibrant and dynamic institutions in vocational and technical education. In each case the institution had been in operation for a few years and the results of the planning efforts could be realistically assessed.

Eight task-force groups met in three workshop sessions. Each group focused on a significant problem or issue in facilities planning. The reports of the task-force groups contributed much to the over all value of the Institute and is included in summary form in this report.

The major presentations of the guest speakers are included in the report. The effectiveness of the Institute is reflected by the responses of the participants to a questionnaire at the final session and to a follow-up three months after completion of the Institute. Instruments used in the study as well as other illustrations of the process of institute planning, organizing, and directing are included in the appendices.

# INTRODUCTION

The facilities that are being planned today and built tomorrow will most likely continue in use for vocational and technical education for the following half century. After the facilities are erected, alterations in most cases are expensive. According to figures recently released 1,872 new area vocational schools will be built between 1966 and 1975 in the states at a cost of approximately $1.5 billion dollars. These facts were fundamental considerations in the decision to provide opportunities to vocational and technical educators, administrators, and facilities planners for updating in this field.

Specifically stated the goals of the Institute were to:

1. Identify trends, develop new approaches, and expand the grasp of knowledge of facilities and equipment planning for vocational educators, facilities planners, architects, and builders.
2. Assemble, evaluate, and disseminate innovative ideas and effective working information relative to facilities and equipment planning.
3. Consider problems and standards significant to progress in this field.
4. Assess the merits of new instructional equipment and other aids associated with facilities planning.

While these goals reflect challenges to the Institute sponsors and participants (giant challenges which might result in large savings of money and improvements of educational opportunity), the evaluation records the successes in the minds of most of the participants.

Ninety-eight participants from 42 states and Puerto Rico were present. Many were vocational administrators holding positions as state directors or supervisors, local directors or individuals deeply involved in the planning of new facilities, teacher educators responsible for teaching this subject to vocational and technical educators, and facilities planners and architects. Every service of vocational education was represented.

The impact of the Institute, as reflected by the participants, the guest speakers, representatives of the U. S. Office of Education and others, while difficult to measure seems to have been considerable. Direct involvement of several participants on the local and state level in building planning indicated the timely nature of the Institute.

The varied nature of the presentations coupled with the opportunities for group dynamics provided for individual interests and needs. The planned program was followed precisely as released to participants prior to the Institute with the exception of two last minute changes.

Without doubt the concepts of many were broadened through consideration of trends and new approaches such as open-space planning. Others secured reinforcements of ideas through learning of the experiences of people engaged in similar activities and having similar problems. Basic philosophy and procedures were covered, including need studies, educational specifications, palnning processes, programming activities, etc.

# METHODS

Approval of the proposal initiated the process of planning for the Institute. Each step of the process was implemented as indicated briefly in the paragraphs below.

## Consulting Committee

A tentative program was developed and presented to a consulting committee for review, comments, and suggestions. Three outstanding educators who had considerable experience in facilities planning served on this committee. In addition, suggestions were secured from three very knowledgeable members of the U. S. Office of Education. Review of the recommendations resulted in some modifications of the program structure and personnel.

## Program Planning

The revised program was a composite of the original concepts, the proposed guidelines provided by the U. S. Office of Education, and the recommendations of the consulting committee. The varied backgrounds and desires of the potential participants were recognized. The program was planned to serve a broad cross section of individuals from these varied backgrounds. Therefore, the range of topics was deliberately selected to provide help for the individual with little experience or knowledge in facilities planning, as well as presenting challenges to the most sophisticated individuals in this field.

## Guest Instructors

Much consideration was given to the selection of the guest instructors. In each case the most competent individual available was chosen. Some were selected because of their deep involvement and broad experience in surveys and need studies; others for their recognized contributions to the field of leadership in facilities planning; others because of the recent involvements in planning and completing vocational and technical facilities.

While considerable variation existed in the backgrounds, abilities, and experiences of the guest speakers, each made a valuable contribution to the total effort.

## Group Leaders

Group leaders were selected for each of the task-force groups. Special consideration was given to the background of each chairman in relation to the subject of the task-force group. The leadership of each task force consisted of a chairman and a secretary. The report to the total group and the written report was the responsibility of the secretary. The chairmen and sdcretaries did a highly commendable job. Visitation to the task forces in session provided assurance that each group gave serious consideration to the issues and problems of the subject under discussion. In addition to providing opportuntities for group dynamics, positive enrichment for the members of the task forces and for the total group resulted from the three discussion sessions and the final report given on the final day of the Institute.

## Trainees

Every effort was made to invite individuals to participate who were in positions of responsibility and in key positions relative to facilities planning and equipment selection. An excellent mix was secured, drawing participants from 42 states and Puerto Rico. Most participants were either state directors or supervisors, or vocational teacher educators. Several local administrators, architects, and facilities planners were present.

The individuals were nominated by the state directors in the various states. Nominated individuals were invited to apply for the Institute. Applicants were selected from those best satisfying the established selection criteria. Approximately 50 alternates were also selected from the individuals applying for the Institute. A few of these had opportunities to attend due to cancellations of individuals in the initial group selected.

## Facilities

The Institute was housed in the modern facilities of the Student Center of Colorado State University.

## Transportation

Individuals arriving by air were met at Stapleton International Airport and conveyed in private cars or by chartered bus to the campus of Colorado State University. In like manner participants returning by air were provided transportation to the airport.

Several individuals arrived by private car.

## Field Study

Observation and study of the facilities of the United Air Lines Training Center at Denver and the Boulder Vocational-Technical Center at Boulder supplemented the presentations given at the Institute. Each facility study brought interesting questions and observations.

The media center and facilities of the new Social Science Building on the Colorado State University campus wasalso visited.

## Program

The program began with an informal reception on Sunday evening, October 26, and closed with workshop task-force reports and evaluation on Friday afternoon, October 31.

The schedule of the program was followed closely. One presentation, "Cybernetic Learning Systems" by Julius Oleinick, was cancelled. However, this technique had been very effectively demonstrated on Monday as part of the presentation of Mr. Michael Russo. To accommodate individuals having early departure times on Friday, October 31, break periods and the lunch period were compressed to permit completion of the program by 3:00 p.m. instead of by 4:20 p.m. as originally scheduled.

# RESULTS AND FINDINGS

The program of activities of the Institute consisted of three main types of activities: (1) formal presentations by guest speakers, (2) task-force group activities involving all participants, (3) field studies of facilities and equipment as previously indicated.

Included in this report are the formal presentations of the guest speakers. The guest speakers are identified in the appendices of this report.

Summary reports provided by each of the secretaries of the task-force groups are included. Many of these are in outline form. However, much value can be gained by studying the reports of these committees. While some task-force groups were larger than others due to the expressed interest of the participants, each was approximately composed of twelve individuals.

## Highlights of Observations

1. Much emphasis needs to be placed on the fundamentals of planning facilities. It was very evident in some cases that participants had risen to high office of responsibility without the advantages of having acquired very much knowledge on facilities planning.

2. Good educational specifications and how to produce them are vital concerns that need much more emphasis. The investment of talent and time to produce these guidelines for the architect still are very frequently lacking. Much emphasis must be given to this aspect of the preparation of individuals for facilities planning.

3. Many people still seem to think that someone can reach into a file folder and pull out a ready-made set of educational specifications and hand these to an architect for design and specifications development. The true role of innovative planning of facilities must be constantly stressed.

4. The need study is a valuable tool that must not be minimized. The need study provides information for program planning. Program planning is essential prior to facilities planning.

5. More attention should be given to organization of programming for facilities planning. A "must" is to use PERT or a similar process for smooth progression without "bottlenecks".

6. Facilities create the environment for learning. The environment should reflect employment needs and provide for media and learning instrumentation.

7. Experience and innovative research have resulted in new concepts of facilities design and learning methodology. More attention should be given to these innovative practices. Some buildings are designed which are obsolete the day the doors are opened.

8. Open-space planning needs to be given more consideration. Viewed from use in industry and business, open space may be just emerging as a realistic solution to some of the space problems. The zoned activity concept with open spaces may be worth consideration.

# CONCLUSIONS AND RECOMMENDATIONS

The value of the Institute has been positively identified in the minds of most of the participants and guest speakers (see tables of findings). Several letters highly complimentary were received from individuals who participated.

When consideration is given to the billions of dollars which will be invested in capital construction for vocational facilities within the next five years, it would seem wise to invest a little more money in the preparation of the individuals who will be writing the educational specifications and making the recommendations to the architects. The persons present at the Institute represented the "cream of the crop" of individuals responsible for making these huge investments in educational facilities. Many of these were highly appreciative of the opportunity to attend this Institute. To help insure better investment of these funds, it is recommended that:

1. An institute dealing with fundamental facilities planning be held every other year (similar to the one completed).
2. More advanced institutes be held periodically for the top-level administrators of states and large municipalities engaged in facilities planning and responsible for the outcome.
3. A brief institute (probably three days in length) be held annually for architects interested in facilities planning for vocational and technical education. These individuals are willing to work with vocational educators but more attention must be given to helping these individuals understand the aspects of vocational education.
4. More research be focused on the elements of facilities and equipment planning.
5. Visual aids in the form of film strips, films, and slides be developed and made available to individuals concerned with facilities planning.
6. Better and more realistic guides in condensed and simplified form be developed to aid individuals responsible for planning vocational and technical facilities for the future.

There is much to be done in the field of facilities and equipment planning if wise use of the material resources are to result in effective investments in capital-producing environments for students desiring to prepare for careers in vocational and technical education. Little attention has been given in providing adequate opportunities for individuals controlling millions of dollars of capital construction to acquire the knowledge essential for making these investments wisely.

# EVALUATION OF INSTITUTE

The evaluation of the Institute by the participating individuals occurred first on the last day of the Institute and again as a fellow-up conducted three months after the completion of the Institute. The responses of the individuals which could be quantified is provided in the tables that follow. Typical of letters received are those contained in the appendices of this report.

## TABLE I

## FACILITIES INSTITUTE PARTICIPANTS; RESPONSES TO EVALUATIVE STATEMENTS ON FINAL DAY OF INSTITUTE

| I Feel That: | Strongly Agree No. | Agree No. | Undecided No. | Disagree No. | Strongly Disagree No. |
|---|---|---|---|---|---|
| The purposes of the Institute were clear to me | 45 | 45 | 2 | 0 | 0 |
| The objectives of the Institute were not realistic | 0 | 4 | 1 | 39 | 46 |
| Specific purposes made it easy to work efficiently | 16 | 64 | 7 | 2 | 0 |
| The participants accepted the purposes of this Institute | 38 | 49 | 2 | 0 | 0 |
| The objectives of this Institute were not the same as my objectives | 1 | 13 | 3 | 42 | 29 |
| I did not learn anything new | 0 | 0 | 2 | 22 | 65 |
| The material presented was valuable to me | 48 | 40 | 2 | 1 | 0 |
| I could have learned as much by reading a book | 1 | 3 | 5 | 39 | 42 |
| Possible solutions to my problems were considered | 12 | 64 | 12 | 2 | 0 |
| The information presented was too elementary | 2 | 4 | 1 | 45 | 37 |
| The speakers really knew their subjects | 11 | 61 | 8 | 9 | 1 |
| The discussion leaders were well prepared | 10 | 50 | 9 | 17 | 1 |
| I was stimulated to think about the topics presented | 27 | 57 | 3 | 2 | 1 |

## TABLE I, Continued

| I Feel That: | Strongly Agree<br>No. | Agree<br>No. | Undecided<br>No. | Disagree<br>No. | Strongly Disagree<br>No. |
|---|---|---|---|---|---|
| New acquaintances were made which will help in the future | 50 | 38 | 1 | 1 | 0 |
| We worked together well as a group | 54 | 32 | 3 | 1 | 0 |
| We did not relate theory to practice | 1 | 7 | 7 | 52 | 23 |
| The sessions followed a logical pattern | 27 | 57 | 4 | 2 | 0 |
| The schedule was too fixed | 10 | 22 | 12 | 39 | 8 |
| The group discussions were excellent | 22 | 51 | 8 | 10 | 0 |
| There was very little time for informal conversation | 11 | 30 | 4 | 35 | 10 |
| I did not have an opportunity to express my ideas | 1 | 1 | 2 | 60 | 26 |
| I really felt a part of this group | 28 | 54 | 5 | 4 | 0 |
| My time was well spent | 47 | 34 | 7 | 1 | 0 |
| The Institute met my expectations | 37 | 42 | 6 | 4 | 0 |
| I have no guide for future action | 0 | 0 | 5 | 50 | 34 |
| Too much time was devoted to trivial matters | 1 | 4 | 4 | 51 | 31 |
| The information presented was too advanced | 0 | 0 | 2 | 55 | 33 |
| The content presented was applicable | 16 | 66 | 4 | 5 | 0 |

TABLE I, Continued

| I Feel That: | Strongly Agree<br>No. | Agree<br>No. | Undecided<br>No. | Disagree<br>No. | Strongly Disagree<br>No. |
|---|---|---|---|---|---|
| Institutes such as this should be offered again in future years | 59 | 30 | 4 | 0 | 0 |
| Institutes such as this will contribute little to occupational education | 0 | 0 | 1 | 28 | 53 |

NOTE: Variation in number of response resulted from failure of some participants to complete item.

## TABLE II

## FACILITIES INSTITUTE PARTICIPANTS' RESPONSE AS TO HOW THEY PLANNED TO APPLY THE KNOWLEDGE GAINED FROM THE INSTITUTE

| Application | Number of Reponses in Order of Importance with (1) Being Most Important, (2) Second, etc. | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Writing an article or other publication | 5 | 2 | 7 | 8 | 34 | 17 |
| Planning meetings for vocational educators in my area on the subject | 21 | 17 | 12 | 17 | 11 | 2 |
| Stimulating more thought and discussion on this topic | 19 | 22 | 15 | 14 | 5 | 2 |
| More careful reviews of existing facilities and equipment | 16 | 31 | 18 | 12 | 2 | 1 |
| Building a closer link with industry, business, and agriculture | 8 | 6 | 26 | 20 | 15 | 1 |
| Other | 20 | 3 | 0 | 1 | 1 | 4 |

## TABLE III

## FACILITIES INSTITUTE PARTICIPANTS' RESPONSE TO STATEMENTS RELATIVE TO BENEFITS FROM INSTITUTE AS EVALUATED THREE MONTHS AFTER THE INSTITUTE

| | Number Responding | | | | | |
|---|---|---|---|---|---|---|
| Information Gained at Institute Helped Me: | Highest 5 | 4 | 3 | 2 | 1 | None |
| In helping plan facilities | 36 | 32 | 13 | 2 | 3 | |
| In helping others to plan facilities | 26 | 38 | 14 | 3 | 2 | |
| In selecting equipment | 7 | 17 | 38 | 12 | 11 | |
| In helping others select equipment | 6 | 20 | 32 | 12 | 12 | |
| In understanding better trends in facilities | 58 | 28 | 0 | 1 | 0 | |
| In planning workshops on facilities | 14 | 29 | 16 | 7 | 8 | |
| In teaching others about facilities | 20 | 33 | 14 | 10 | 3 | |
| In construction of educational specifications | 19 | 35 | 23 | 7 | 1 | |
| In teaching others to better construct educational specifications | 11 | 33 | 25 | 9 | 2 | |
| In evaluating proposed plans for facilities | 30 | 37 | 14 | 5 | 0 | |
| In planning the structure for facilities planning | 22 | 35 | 18 | 7 | 1 | |
| In writing articles on facilities and equipment | 6 | 24 | 19 | 13 | 14 | |
| In planning programs for facilities and equipment improvement | 14 | 35 | 22 | 7 | 5 | |
| In writing proposals for funding facilities projects | 5 | 19 | 23 | 17 | 15 | |
| To build a closer link with industry, business, and/or agriculture | 14 | 25 | 31 | 4 | 7 | |
| To apply concepts of the "Pert" process | 14 | 35 | 21 | 6 | 6 | |
| In my research activities | 12 | 22 | 28 | 10 | 7 | |
| Writing articles or other written materials | 5 | 18 | 27 | 12 | 13 | |

TABLE III, Continued

| Information Gained at Institute Helped me: | Number Responding<br>Highest<br>5 | 4 | 3 | 2 | None<br>1 |
|---|---|---|---|---|---|
| In preparation of speeches | 5 | 27 | 27 | 11 | 9 |
| By providing a useful administrative tool | 17 | 37 | 21 | 8 | 1 |
| Through new insights and approaches to some of the problems of vocational education | 39 | 30 | 13 | 4 | 0 |
| In conveying the concepts and understanding of vocational education to the public | 23 | 32 | 24 | 4 | 4 |
| In working more effectively with other educators | 29 | 42 | 9 | 3 | 2 |
| By providing a guide for future action | 32 | 36 | 16 | 1 | 1 |
| To stimulate others to improve instructional programs | 18 | 37 | 23 | 4 | 1 |

## TABLE IV

## FACILITIES INSTITUTE PARTICIPANTS' RESPONSES TO PARTICIPATION IN FUTURE INSTITUTES AS EXPRESSED THREE MONTHS AFTER INSTITUTE

| Item | Number Indicating Responses Below<br>Yes | No | Uncertain |
|---|---|---|---|
| If you were presented the opportunity to attend a more advanced institute focused on facilities and equipment would you be interested in attending such an institute under conditions similar to those for this institute? | 79 | 3 | 5 |
| Would you recommend to your friends in vocational education attendance of such an institute if the opportunity were made available to them? | 83 | 2 | 2 |

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# APPENDIX A

# PRESENTATIONS BY GUEST INSTRUCTORS

## THE CHALLENGE - BETTER PLANNING

Michael Russo
Chief of the Planning and Evaluation Branch,
U. S. Office of Education, Washington D. C.

I am pleased to be here and I am most pleased to see Dr. Arnold here. . . . This is the third facilities institute that we have tried to initiate. This one has come about two to three years late. From this point of view, we initiated the first one a few years back at Palo Alto; then, we continued by having one at Las Vegas. . . . In the first institute our primary concerns were to try to project to the people throughout the country the type of facility required to meet the needs of the future. That was our big charge and we had quite a time convincing our educational colleagues and also our architectural colleagues that educators could see down the road and determine the types of facilities needed. I think we managed to get this point across. For the last four or five years we have seen the initial phase of this developed and now we are going into a different phase which is going to require, at least in my estimation, a great deal more thought and an entirely different approach. In other words, the ground work has been laid and the spade work has been done quite well. I think everyone throughout the country has appreciated this, has picked it up, and is running with it.

Now we are going to challenge you further by things that are our responsibilities. If I have the tendency to direct my remarks primarily toward vocational-technical education, I do want to say that that is my primary concern. However, I immediately want to inform you that all the presentations will be based on the fact that we must touch on all aspects of the educational spectrum. Vocational education is not an isolated, individual unit by itself but an integral part of our educational spectrum. . . .

. . . In 1964 we had a little more than 4,500,000 vocational-technical students. In 1968 that figure had gone up to a little over 7,500,000. Some people have looked at this and have said, "Well, this is a sizeable increase. You have made a tremendous stride." I, for one, am not too pleased with the increase that we have made for the simple reason that, I am sure you are aware, a good portion of that increase came about when the Vocational Education Act of 1963 was passed. . . . We had 7,500,000 vocational-technical students in 1968. By 1975 we are looking forward to a potential enrollment in vocational-technical education of 14,000,000 students which is double the figure of 1968. Now this is a very sizeable chore to undertake. There will come a time when it will show us that if we continue our rate of construction as we have in the past four or five years that by 1975 we will have a shortage of work stations.

Let me define a work station. A work station is that particular situation where you can have one student at one particular location -- either bench, desk, machine, etc. By 1975, even at our present rate of construction we will be over 1,723,340 work stations short. And at our present rate of construction, if we were able to maintain it, we would only be meeting approximately 20 per cent of the needs. . . .

. . . The total financial effort, of course, will greatly exceed the maximum effort that our state, local, and Federal sources can possibly maintain at the present rate of reimbursement. It also comes about at a time when there actually has been throughout the country, and I'm sure you are all aware of this, a taxpayers' revolt in relationship to the funding and the bonding for schools. Now, I say this because this is, of course, something that we were hoping would not come about. In 1964 of all the bond issues that were being planned throughout the country for our educational institutions including vocational-technical, only about 25 per cent did not pass. In 1968 that percentage went up to 43 per cent, or one out of every two schools that were going forth for a bond issue were turned down by the taxpayers. . . .

. . . At the present time there is a great deal of consideration being given to putting the approximately $60,000,000 of Federal effort that has been expended in construction into our program for the programmatic purposes. . . . If the Federal efforts should be pulled out in some way through amendments or administrative decision this could definitely put the state and local effort in an extremely precarious position. . . .

. . . We are hoping that this does not come about but you may as well be aware of the fact that this is one of the things that my two colleagues are grappling with constantly. We are constantly trying to present to the Congress and to the Budget Bureau people, the facts and figures. . . . We can not possibly have this type of enrollment nor can we meet the charge that is given to us by Congress to meet the needs of more people and make vocational-technical education available to all, unless we do have the proper funding situation. . . .

Back in 1963 and 1964 whenever we discussed facilities we were saying that we had to get out of the cigar-box approach. . . . I was thoroughly disgusted when I would sit down with my architectural colleagures and find that the idea of an educational building was simply to have 20 rooms, 850 square feet, or else you would have 10 shops, 24,000 square feet or something of this nature which indicated to me very little, if any planning. They were simply trying to give you a facility. We were saying that the building had to be of the type that could be converted practically overnight in order to meet the needs and the changes of industry. We pushed very hard in terms of the interior structural design, the non-bearing-type facility. We are very pleased to find, for instance, that prior to 1963 from 12 per cent to 15 per cent consist of bearing walls which means that we have about 10 per cent to 12 per cent more educational facility than we had in the past due to the open-space concept. . . .

Back in 1963 and 1964 we would suggest the proper type of facility to build to eliminate the criticism that we, in vocational-technical education did not have the capability to rapidly adjust our program and make changes to meet the needs of the industry we were serving. We have coped with that challenge. We have developed the esthetic values that we think should be in a facility. We have the architectural community now well aware of the fact that educators, you people, certainly are interested in having these facilities which would be both functionally challenging and also of esthetic interest to students. I use the term students in the broadest concept. Now, I think we should look at the following twelve points. . . .

First, I think we have to look at the possibility of larger classes. In other words, for years, vocational educators, in most instances, have tried to have an enrollment that averaged between 16 to 20 students per class. I don't think we will have that luxury from now on. We will have to find different methods of teaching. It will definitely mean that where we used to have a very close relationship with the student we are going to ask you to maintain that type of relationship in larger classes. Somehow, you must maintain the close relationship and in some way increase the size of the class. This is going to be a very difficult thing to do. We will have to increase the size of the class but not necessarily at the expense of an increase in amount of equipment.

Second, I think we will have to look very, very closely at the utilization of what I call different time frames. We must look very closely from the point of view that many states to this date are maintaining the three consecutive clock hours which we have had for years. Can we continue to do this? Does this mean that perhaps we will have to cut down on the clock-hour basis? Perhaps, we have to move into more of a period basis which is far more acceptable to any administrator. When we condense our program, avoid less repetition, and still turn out the skill that we have always been noted for, we have done a wonderful job. . . .

This is a challenge, ladies and gentlemen, which you must look at very closely. You must look at it very closely because one of the criticisms that we have received from the Congress and from one end of this nation to the other, has been the inability as they see it, of vocational education to a good hard look at the programs that we are offering. We must come up with a method of streamlining these programs and still turn out students who are acceptable to the trade that he or she intends to enter. . . .

Third, without any question we have to take into consideration the needs of individual differences far greater than we did before. . . . One of the two stepping stones to our dropout problem, is individual differences. It means individual differences, not in terms strictly of skilled training, but to a degree you are going to have to probe and pry to find exactly what are the problems that these students have that I don't think these are in any priority order.

Fourth, I think that without any question, our schools must be maintained on the basis that we can utilize them 24 hours a day, year around. We cannot afford to go by a school building any evening and not see the lights on and a great deal of activity involved in it. We have too many people who cannot come in at specific times whom we would like to see educated. It means that we will have all types of schedules going. These facilities must become community facilities. They are paid for by our taxpayers. You educators must have a degree of personal feeling toward it. This is your school; these are your facilities; but bear in mind that these belong to the taxpayers and you are hired by the taxpayers.

. . . Fifth, there will be multiple staffing, and what I call simultaneous teaching. I'm definitely saying that in the open-space concept you will have to teach in such a way that you will have more than one skilled craftsman involved. You may have a skilled craftsman; he may have some assistance. You will have one skilled craftsman who not only is skilled but will also have the educational know-how. He will be the craftsman who also has a degree in terms of our educational components that are necessary for good teaching.

You will also have multiple staffing in order to maintain these buildings properly on a 24 hour basis. You will have more than one instructor in any given area. You will be hiring staff, not one on a contractual basis but you will hire two or three. Some school systems are doing it now. Some school systems have a staff on contract from 8:00 a.m. until 3:00 p.m.; then they have another staff on contract from 4:00 p.m. on. This is a tremendous problem to us in education. You know the problem of having more than one instructor in the same facility. . . . No longer can we have the luxury of saying, "I am a shop teacher; I have this class. This is mine and mine only." In fact, we control this to the degree that if we ever caught anyone in there other than the custodian we almost want to throw him out. . . .

Sixth, is the concept of clustering of occupations. Now, when we get into this dialogue of clustering of occupations, I think that this is perhaps, one of the most difficult areas to explain for the simple reason that when we start talking about clustering of occupations we like to cluster in terms of like units. We talk in terms of metal units, electrical units, electrical units, electronics, and so on. . . . Vocational education and industrial arts can no longer, as they have in many instances of the past, go their separate ways. No longer can industrial arts, vocational education, and general education go their separate ways. If we are going to cope with the massive problem that we have in the areas and out in the field of thousands of people who need training and retraining, these barriers between all of our educational components must come down. In my mind, if we as educators don't take these barriers down, believe me, someone will, in some way. Now, the challenge to you is can you see these barriers and can you take these barriers down? The clustering of occupations in the open-space concept is quite adaptable. It minimizes the duplications of equipment. It means that instructors will always be under very close scrutiny. . . .

Seven, is our need for closer coordination with labor and industry. . . . One of the strong points we have had in vocational-technical education over the years has been our ability to have what I think are some excellent co-op programs. This is a joining of hands between the educators and industry. . . .

Eighth, I am combining seven and eight when I say closer coordination with labor and industry would be co-op education. . . . Now, co-op programs will allow you to give the student education in a much broader concept using perhaps the latest equipment that industry has. . . . What does this mean in terms of the facility? Exactly what type of facility do you have in that building to take care of the educational componenets of that co-op student? This is a very interesting thing to look at. Does it mean that we can now modify our shop to more of a lab concept in some instances? . . .

Ninth, is what I call unilateral involvement with our academic colleagues. What I am very much concerned with is that over the years, we, in vocational education, have been criticized severely for working out our problems in isolation. To a degree I think we can be justly criticized. What I am saying now as I said a little earlier, it is not possible for us to work with students, understand their problems, delve into the problem, try to cope with the individual needs, and do this in isolation from our academic colleagues. Of course, the same applies to them. They in turn can not do it in isolation from us. . . .

We all have to pick up our share of the responsibilities. We are working very, very carefully and very, very hard with many of our academic people in terms of modifying their programs to dove-tail with the needs of these students, so that we can have a concerted effort to maintain the students' interest in school and perhaps turn them out as productive, producing citizens.

Tenth, is the development of new types and new approaches to curriculum. When I say new types of curriculum I am not referring to the fact that we have many new occupations on the horizon and consequently we have to develop many new curriculums. . . . We are saying that you have to break down the curriculum in such a way that if the student has a capability up to a given point then our curriculum should be able to meet his objectives; be taught in that manner, almost on an individual basis if you wish; sectionalized if you wish, but it should involve all these other components which make the total scene. This is becoming extremely difficult in some of the more technical areas, but the interesting thing when we talk to our colleagues on the technical phases of education is that a year or two ago, they were saying if a student is capable of handling a technical program he usually has the ability to handle higher math and science so we don't have this problem. My challenge to you who may be saying this is how many students due to the type of testing we give them show poorly and consequently do not enter the technical program? They should be given the opportunity to try. I dare say, many of them would emerge and they would tell you that they do have the ability to move into the higher technical phases of education if a curriculum were geared to meet their needs. As you develop a curriculum to meet their needs you then have to look terribly hard at the facilities and the equipment and the methods of instruction. In other words, I am saying that we have many minority groups, disadvantaged, and handicapped who have trouble because of the type of testing. Our curriculums in the past in many instances have been geared to those people who could meet the basic requirements of those tests. . . .

We have countless meetings with minority groups. It is most interesting to find that if we take the opportunity which presents itself and if we move in this direction, in many areas, many of these students have a wonderful capability. We haven't been able to develop them at the present time under some of the methods and types of curriculum that we offer.

Eleventh, I am concerned with the framework of the educational institution you may be working with prior to the development of educational specs. . . . The reason I say this is that quite often we receive materials in the office from people saying, "I'm sending you our educational specifications. Please, look them over for us and assist us." . . .

I was very much concerned, for instance, at what they call educational specs. I was very much concerned with the lack of what I call longitudinal study. I was concerned with the fact that I would see, for instance, a shop or lab and would see a classroom attached to it. This is the related room, a lab or class, you know. Then we asked them how -- where is this student going to get this interrelationship with the rest of the program? And we found out that while the latest building was being built it was really creating an artificial barrier between the vocational-technical unit and the academic unit. . . .

Twelfth, is the one priority for facility. If you don't consider all the other 12 aspects you can not come up with a realistic approach to educational specs that an architect in turn can interpret and put into a building. . . .

In industry one walks into an office; he sits down with the people. They present him with a product that they are going to produce -- what they intend to produce in the next five or ten years. What does this mean in terms of the population they will be hiring? What does it mean in terms of equipment? He goes all through this production procedure that they have to go through, and then he builds a framework around it. This is exactly what we are saying for you in education to do. The only thing is that the product that you are going to produce is not that easy in education. It's one thing to develop something of a material nature, but people in education are working with a human aspect which varies and changes constantly. Now, can we build a facility that I call a living, breathing thing; that will adjust itself to the needs of those students that enter your building? This is what we are concerned with. How can we apply the use of brick and mortar which is one of the easiest things we can do? How can we apply the design factor to meet all these other aspects I just discussed to meet the needs of these individuals? What we are saying very clearly is that the schools must be built so that they will inspire, so they will motivate, and so they will truly capture the imagination of the student and be relevant to his needs. . . . These are intangibles, but we must be able to capture them, we must strive to capture them. And after we have captured the, then we must start breaking these down into a type analysis required in order to transfer these elements into a facility. We must design functional buildings that are truly alive -- alive to the degree that they have an atmosphere of dignity, an atmosphere of respectability, and not have the hard, cold, and impersonal institutional structure atmosphere of the past. We must be aware of the esthetic values from the point of view that if we do not develop an appreciation of the esthetic values of life within our school unit, in many instances our students will not be able to achieve them in any other way. When I say that these schools will truly belong to the community that's exactly what I mean. They are community oriented and community cnetered. . . .

How can we generate our thoughts and transmit our ideas to the architect? For some of my architectural colleagues who may be here I take this position with them. You, as educators are responsible for educational complexities that will be involved in that building. They in turn are responsible for translating that into the building that will house the educational complexities that you are asking for. It disturbs me at times when I find that educationally we are not sound in what we present to the architect and he in turn starts to assume the role of telling you what the building is going to be like . . . .

We find in many instances the school people relinquish their authority to the architect and the architect has no other choice but to take it and run. Now when he takes it and runs I will say this, and I defend him from this point of view, that even though he does this we have been extremely fortunate in most instances that the architect is more than willing to take additional time and expense out of his own interests in order to give you the educational complex you need. . . .

We have made tremendous strides; there is no question in my mind on this. But pleast don't think that because we have gone from 405 area schools to 1,800 (Now, I'll simply mention the area schools because this is the only school that is acceptable as far as Congress is concerned in terms of utilization of construction) -- even though we have made this terrific increase this does not mean that we have actually picked up that many more or new additional work stations. And this is what we have a difficult time presenting to Congress. . . .

In conclusion what I'm saying, ladies and gentlemen, is that we have a tremendous task. We can not go it alone. It think that this is one of the weaknesses in terms of our implementation of the 1968 Act. I think we tried to go it alone. In other words, we became so immersed in the problem (and there is a tremendous amount of dedication) that we immediately moved. We started moving so fast trying to cope with these problems that we quite often forgot to bring along what I consider our client's help. Now I'm not using the term client's help in terms of vocational students; I'm talking about our client's help of other educational colleagues, labor, industry, and so on. We moved but we did not bring them along with us. So we have reached the point of the game where we now find ourselves trying to justify certain things and we don't have their support. . . . So I will conclude my remarks on that and look forward to the next session where we will go into things more specifically.

## TRENDS AND NEW DIRECTIONS IN PLANNING FACILITIES WITH IMPLICATIONS OF THE 1968 ACT

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. . . We opened the session this morning by stressing some key points to you. . . .

. . . When the Vocational Education Act of 1963 was passed Congress gave us the authority to move in practically every direction. We were picking up a program that had, in many instances, to take a radical change in direction from what we had done for years. I think we did an extremely exceptional job in doing this. However, we did not have the capability, at least, I don't think we had the capability, to move on the broad front that Congress thought we should. So the 1968 Amendment came. Congress, in order to assure that certain parts which they are definitely concerned with in regard to the people throughout the country and their needs, put in what we call the 40 per cent set-aside.

The 40 per cent set-aside was a method Congress used to guarantee that all of us in vocational-technical education who would be working under the 1968 Amendment would definitely be obligated to follow at least these commitments. Congress has stated that 15 per cent of the allocation for the states must be used in the area of the disadvantaged, 10 per cent in the area of the handicapped, and 15 per cent in the area of post-secondary education. This is what we call the 40 per cent set-aside. . . .

This actually means that 60 per cent of the total allocation is now available for running the programmatic aspects of Part B of our program. This, in turn, means that the people at the local level as well as at the state level (but I'm talking now primarily about the local) will have to show justification as to why they have established a program, the priority needs, and so on. There will definitely be a certain degree of budgetry constraint which could in some instances require, if need be, the fading out of certain programs in terms of priority need at a time when we are saying that we should double our enrollment. Now, this is a very interesting situation. As we analyze this further, and I will try to dove-tail the 1968 Amendment in with this, I think that what Congress is saying to us is that there must be some vocational education. What Congress is trying to say is that in spite of the fact that technologically we are changing rapidly we still have too many people that don't have the very basic skills in order to get on the first rung of what technology demands of them today. . . .

When we emphasize the needs for the handicapped we always emphasize it from the point of view of the architectural rendering that is required. We are talking about the ramps and the escalators. We are talking about the electronically controlled doors. We are actually talking about facilities in terms of sponsoring that which would enable the handicapped to use the facilities. We are talking about the proper hand railing and so on. What we are saying now in relationship to the handicapped, and I think this is what Congress is saying too, is that we have a charge and a responsibility towards many of these people who are presently shunned aside by society but who would have a great deal to offer to society if they were emersed in the main stream. Take them out of isolation, give them an opportunity to lead productive lives, and give them an opportunity to involve themselves with all of us.

There are countless thousands of handicapped students who could be productive citizens would be an additional, excellent resource to our community who are actually vegetating due to the fact that we as educators have not taken it upon ourselves to develop the type of facility, equipment, and curriculum to involve them in our regular program. We have by-passed them, we have neglected them, and Congress is saying you will look at that need and try to overcome that problem.

In relationship to the disadvantaged the interesting point here is that we can show that there has been a sizeable increase of understanding. With the understanding there has been a sizeable increase in terms of reallocating staff time, funds, and so on to meet the needs of the disadvantaged. We also find that there still is, in many instances, an unawareness of what we mean by the disadvantaged.

I say to you here now that rather than waste time going through the dialogue of explaining who the disadvantaged are, I say just look around every day and take any person from where he is at that particular time and find out what his inadequacies are. These are. These are the disadvantaged. A person is not necessarily disadvantaged because he happens to come from a ghetto area, a rural area, or a large city area. Take the individual as he comes to you and analyze his educational background, his community background, and go from there. I say you have to take them where they are and if there is an educational deficiency of any kind or a health deficiency of any kind, try to cope with this problem and overcome the disadvantaged factor. . . .

The problem is where the people are; we must cope with it. In other words, we have took at it from the terms of a massive vocational educational fusion. We have to look at it in terms of an entirely different approach to job-skill analysis. We have to look at it from the point of view of a broader educational background and I'm sure that all of you are aware of the fact that for years we were accused of too narrow a background for our vocational students. . . .

. . . Now, it takes an extremely energetic, administrative unit to be able to cope with these problems and rapidly move into these areas. But it must be done. In order to do this we are seeing some variations of the area schools. I'm somewhat disturbed with some of the concepts of the area schools as I stated to some of my colleagues. I get a little concerned when I see a new area school and all it is. Rather than the old social Siberian concept we have a new social Siberian concept. I'm very much concerned about this. I'm concerned about the integration in terms of the related subject of the so called area schools. How strong an administrative component do we have that utilizes what the feeder school has and what the area school has and combines the two? Or do we both stand separate?

This is why when we talk about the skill-center concept, we are talking about a form of an area school. This is a kind of concept that we see coming out very strongly. It simply means that they have found the ability and the capability of making a rapid transition practically overnight in order to train on a long or a short-term basis. This is all a skill center is. If there are a number of people to be trained or retrained for a specific job, we have the capability in the skill center to do it overnight. I say that the area schools can do the same thing. I say that the vocational schools have to do the same thing. So, this skill-center concept can be applied to the facilities we have, if we use proper initiative and imagination in order to do so. We see an integration need with all agencies. What we are saying here, and this is what the 1968 Amendment is saying to us very strongly, these schools are community schools. The belong to the community. . . .

. . . Let me use the health field as an illustration. The reason I use this is that we as vocational educators have been extremely negligent in the amount of effort that we have put into this field. The amount of growth in this field is very distrubing in spite of the energetic drive of many people to get this off the ground. Health occupations must be given more of a tremendous boost. . . .

. . . No longer can we have the luxury of having a dental technician program for three, four, five, or six hours a day, and in the meanwhile people in the community are suffering because of a tension in that particular area. You do not have the luxury of closing those facilities down at 3:00 p.m. whereby we could have perhaps a medical staff come in and utilize those facilities and take care of the people. It is very unrealistic and has proven itself so many times when people in our educational facilities have given them a slip of paper and told them to go across town at a given time to a clinic to be examined. That person will never go there even if he has the capability of getting there. They have been stepped on, downtrodden for years; they want attention and they want it now. They deserve it now. This is what we mean by a total community involvement. This is what we mean by integration with our other agencies. . . .

. . . We see in many cases where they have combined a small library in the community with that of an educational institution, and, in some cases phased out the local library. Now, this we have been able to do quite readily. It is a form of a trend that we see developing. The reason is very obvious. Library books, etc. have a certain connotation and acceptance by our other academic colleagues. When you incorporate them into a vocational-technical institution you have their support because, you see, you are reinforcing, in their estimation, the role that they feel they should play in terms of making everyone aware of the needs. . . .

. . . I please with them if we are going to move into the new media, the new trend as we see it, the library will not be based on number of volumes. It will be based on what I call the mechanical utilization and electrification of the unit. It will be based on how many different methods you have of presenting the volume. It does not have to be the actual book itself. It will have to be a library that is not based on numbers of shelves, but on individual student use. . . .

. . . We are finding many people who are not enrolled in a program who are now dropping into this chool library the same as they normally would have done with a library that is downtown. This has to be. The library should be a technical resource for the community. It also should be a technical resource for the people in that school. In other words, why should the student who is not enrolled in the field of electronics, if he or she has an interest, why should he not have available to him the library so that he can read these books? . . .

. . . In the area of co-op education, as I mentioned earlier, the Act definitely makes very, very strong reference and spells out very strongly the needs of co-op education. I think we are making considerable inroads in that particular area. I don't think that we have taken the fullest opportunity that prevails in that area.

How many students can a coordinator actually supervise in a co-op program? Ladies and gentlemen, we have tried to run an analysis on what we have seen in the state plan and projected plan. But it is a problem for us to come out and say we would recommend such and such a figure. We find some places where they are talking about a coordinator who has as low as a dozen or so students and we have another one who says a coordinator is going to be responsible for 200 students. I think a great deal of this is going to have to be developed. The situation will have to revolve around the district that is being served, the capability in the district, and the expertise of the coordinator.

A great deal of our co-op education has been in the field of distributive education. I think they have done a wonderful job. The people we have serving as coordinators there basically came up through the field. They have their degrees in this, etc., and they understand the field of marketing, merchandising, and so on, very well. We also do a great deal of co-op education in T & I, Ag., and so on. But, too often, we find that the coordinator is being asked to do more and more, and not simply coordinate within their respective narrow field for which they have been trained. It creates a definite problem. The problem is that they have to immediately, practically overnight, become extremely aware of exactly what these other fields are doing, what they stand for, what is meant by co-op in their area, and what the responsibilities are of the educational institution in preparation for them to co-op. This is a very challenging thing to us in the area of consumer and homemaking. This is an area that I find very difficult to adjust myself to from this point of view. . . .

We find Congress saying more and more that home economics has to be geared toward gainful employment. Fine. We think we need a balance of both. . . .

Our problem in the area of home economics which my two colleagues will have to grapple with more and more is what kind of facility do we need? Do we need any change in relationship to what they have now and what we think they have to have more of? This very interesting dialogue has been going on for quite a few years. In other words we are saying we see many home economics facilities where you come in and still see a series of sewing machines. Now the question comes to my mind in evaluating the needs of our people, the economic needs, and so on -- are we overemphasizing any area at the expense of another? In other words, are we creating the delicate balance that we need between gainful home economics and homemaking? Can we justify both? How do we approach it in terms of facilities? . . .

. . . When we start talking about the area in terms of the proper diets and so on I think that htis has been one of the most seriously neglected problems that we have had in the area of the disadvantaged. In many cases the disadvantaged simply do not know, they have not been informed, and consequently we have serious health problems. Do we need the same type of home economics and consumer units as we have now? We used to pride ourselves when we established home economics on this basis. We used to go in and say, "You will have a variety of gas and electrical units. You will have sink units with garbage disposals. You will have dishwashers. You will have washing machines, and then if you are really plush you will have a dryer." Now, this is how we used to evaluate our units. As one came in, these things would be in the aisles. There would be the sewing machines; we would have the dressing room. Now, ladies and gentlemen, stop and think, how many of the people that we will be serving if we do our job, would even have these in their homes to use?

Should we be exploring other methods of presenting this that will definitely change our physical facility in order to provide these courses? Consider it and think of it because I think it will be most interesting to you.

What I call the transformation is definit; there is no question of this trend here in terms of open-planned facilities. I discussed earlier that some of our teachers were a little concerned because everyone was looking at them. The interesting thing about the open-plan facility is this; let me give you some statistics. In the state of California, for instance, counting all educational institutions from all levels, they are presently building at the rate of a new school every day. Twenty per cent of all elementary schools built in the past three years have been totally open-interior. Seventy-five per cent contain some open areas. In the state of New York since 1968 from grades K - 14 every building is being designed with the philosophy of what they call the unwalled teaching complex. Fifty per cent of their intermediate schools are being built with that concept. In Jefferson County, Colorado, fifteen schools have been built without interior walls. Now, ladies and gentlemen, what I am trying to say is that we take our students in grade K and we put them through this type of educational complex. They grow in it, they understand it, they move along quite well in spite of us and then suddenly we get them into what we call senior high school and for some reason or other we don't want this open concept. But what I am saying to you is, it is not the inability of the student to adapt to the open concept; it is the inability of the instructional staff to adapt themselves to the open concept. This must change. Not too many months back we had the opportunity of taking one plan, one blueprint, we pleaded with them to take out many of the interior walls. When we got through they said, "Fine, we'll go back and we'll redesign this and we'll take out many of these partitions because they are nonbearing." . . .

The superintendent of public instruction of that particular state wrote and thanked me because when they were going for the bond issue they were going to have to cut out a number of footage which would have seriously hampered the growth of the program but now by eliminating the non-bearing wall partitions they have been able to include those in the basic contract without additional cost. . . .

As you go through you will see many different activities going on adjacent to each other. It doesn't seem to be a problem. The problem in most cases in a teaching situation is that the teachers themselves find it very difficult to adjust to this concept.

The other concept of the open space that I see more and more is that we see less and less glass space being utilized than we have ever seen in the past. We are seeing more of the fisual strip utilization to give a sufficient amount of exterior lighting. We don't see the huge expanses of glass because I think we have found over the years that this is one of the poorest ways of cooling a room plus one of the most expensive in terms of heating. Of course my argument has always been that I think most of the windows were established, at least in the academic section, for the need of the teacher. . . .

. . . We see a different utilization of block construction, glass and otherwise, in order to get full utilization of light. When we first talked a few years back about eliminating many of the large expanses of glass we had a great deal of opposition from our teaching staff. They talked about the younsters having claustrophobia. An interesting thing is that we then tried to counteract this by the use of many pastel shades. We found that this was not the answer so we started to take a different approach. We went away, to a degree, from the pastel shades and instead used vivid shades which as far as the youngsters were concerned made them happy. It bothered the teachers, however. . . .

. . . The age old argument that you should not have buildings that are basically underground, you know for many, many reasons, is not valid. Let's illustrate by using this room. What difference does it make to us to know whether we are on the second floor or if we are 20 feet under ground? You don't see anything out there; we use artificial light, so if we were 20 feet underground right now it would be the same thing. We can still have the drapes up there the same as they are now. You wouldn't know the difference, you wouldn't know you were underground. We could have a solid block wall there, put up some drapes, you'd have the lights on. . . .

If the people overseas such as those in some of the countries like Sweden and Denmark could only build on the basis of what some of us think, it would have to be on a flat plane. If you see their facilities, from their educational facilities to their housing facilities they are literally hanging on the side of very sharp cliffs. . . .

I think the age old concept where every student opeates strictly from a machine that is comparable to the one that is in industry, or even a modified version, is a luxury we cannot afford. In an automotive area, there was a time that as soon as we started to design a facility we want X number of spaces for what we called life models, live cars. What happened was that because of the three consecutive clock-hour base the group that worked on the cars in the morning left the stalls occupied until the job was finished. The jeeps coming in in the afternoon had to have another set of stalls. Quite often we would have one full vehicle, 24 feet long taking up a terrific amount of space simply because somebody wanted to adjust a carburetor. Now, what we are finding is that there is less attention being given to bringing in "live models". There is far greater emphasis based on cannibalized units without the shell. We are finding that carburetion is being taught off a series of benches that have different carburetion units set up. The automotive unit as we have seen it in the past, to a degree, is phasing out.

Let me give you an illustration of what industry is doing. Industry, of course, is putting in the diagnostic unit. In other words, you will wheel a car through a series of electronic instruments, scopes, and so on. They can tell on the other end with a computer printed card exactly what is wrong with the car. Industry is also saying that very shortly, if they continue the methods, that you will be able to take a car in and not just one mechanic will work on it. Three or four mechanics will immediately get to work on that car and get it out.

Diagnostic centers are the things that we must look at. We must eliminate this business of just locking up thousands of square feet because of these live models. Now, what this will do to your automotive program is going to be most interesting. It will require this curriculum development that I have been talking about. You will only service those units of a car that fit into the total curriculum program that you are teaching at that time. It will not be an automotive facility designed to meet the needs of Johnny who has a jalopy and who would like to work on it. . . .

. . . The square footage that some of our people are putting into some of our shops is fantastic, absolutely fantastic. There was a time when we used to use a module of 60' x 40' and called it comfortable. The module then went up to 80' x 40' and it is continuing. We recently reviewed one and they had something like 46,000 square feet in an automotive shop. They had 46,000 square feet with either 10 or 12 overhead doors. And I said "Isn't this interesting. The local garage downtown doesn't have this. Now, if you intend to heat the entire community this is excellent but I don't think you can afford this." We actually had the school administrator and the architect look at us and say point-blank that the automotive people downtown who were doing this for a living went on record as saying this is not the type of facility they would have. They said they could not afford it. We are teaching but I don't think we are putting our money to the best use in this facility. I think we have to find different methods of teaching auto mechanics. If we are going to have to teach transmission, can't we do it on static units? . . .

. . . The day and age of pulling motors apart as we did before is going by. Now, I'm not saying that we have to neglect this training -- don't misunderstand me. I am saying that we cannot have a total facility based on that concept and then have very minimum utilization of a facility because of this. We are finding that the size of the shops must of necessity be reduced. . . .

. . . Another concern that I think we had better look at very carefully is are we adequately preparing a room or a facility of some description where the team-teaching aspect of the program can be used effectively? As you go into team teaching, and as you develop this type of approach you have to have greater consideration in terms of where the teachers can prepare their materials, where they can review their materials, where they can meet prior to going into their individual groups.

Everywhere we turn in the educational field we find more and more attention being given to the nongrading of students. How do we go through a vocational-technical program on a nongrading basis and still develop the needed skills and competency? How can we meet the individual needs? How are we going to program for this? What type of machine teaching are we going to utilize? This is one aspect that we have not done much with in vocational units. We must look at this and as we go into the nongrading capability we must remember that we go into individual needs much more through machine teaching. At his own rate of skill he automatically goes at his own rate and he grades himself as he goes along. In spite of the fact that you have a nongrading situation you are indirectly grading him as he progresses. You realize how far and how effectively you move along through this nongrading process which is very difficult, but we must cope with it.

Program learning is a phase of it. How can we program our vocational education on a computer-machine basis so that the student can move and move quite rapidly. In other words this definitely has a great deal to say in terms of flexibility. If you go in for the open-space concept, it lends itself beautifully to many different artictic renderings that we have never been capable of utilizing in the past. We will have facilities that are beautiful to look at as well as functional.

We, also, have a problem in our planning. We have to have a greater sensitivity in planning and in attention to environmental details. Now, when I say a greater sensitivity, I'm not talking only in terms of the color dynamics, the textures, and the varieties that we see. Here is an illustration of total dynamics and utilization of texture. The walls in this room are what we call textured; you see the color dynamic space throughout the entire room. We have to give greater attention to this for many reasons. Many of the rooms that we see and the way that the room is treated aren't simply treated from the point of view of its aesthetic value. They are utilized for sounding. They are also utilized to camouflage certain units that will transmit hot and cold air. They are utilized also to camouflage many of the unsightly buckwork, whitework, and so on that is necessary in every building. In other words through homogenous arrangement between all of these units we develop a structure that is very pleasing and has a sensitivity developed in this planning factor.

It is most interesting to note changes in environmental control. Seven or eight years ago, we had very little environmental control. We did have a certain degree of zoning where we could divide the building and zone for heat, light, and other environmental factors. In terms of total vocational facilities that have been built within the last seven or eight years, we have a gross figure of approximately 30 per cent of them totally air-conditioned. The reason that the percentage lowered to the 30 per cent bracket is the fact that we are still not air conditioning many of our larger shops. For some reason in the eyes of many people the student who is involved in a machine shop, automotive shop, or something of this nature is immune to the needs for a thermal environmental control. . . .

. . . You go through many of these units and you will see terribly high ceilings -- absolutely wasted space. . . .

. . . Now, I've talked briefly about the machine input. My understanding of machine input is going beyond the use of educational television, radio media, slides, and so on. It goes much further than that. We are talking about all of the different audio recordings and overhead projectors. We are talking about the establishment within facilities of what we call communication centers which can be used as learning situations and which also can be utilized for beaming information to other school componenets. This in turn means that we find a different utilization of lecture rooms. This to me has been one of the most pleasing things that I have seen. We are finding as we cluster and combine, if we go into a different architectural rendering, that we are eliminating the individual classroom for shop or lab. We are coming into a different type of lecture room. We are finding that our lecture rooms, in many cases, are combined so that they are utilized by many component units. We are finding lecture rooms that actually have the facilities to move heavy equipment on track systems for demonstration purposes. We are finding that through the proper utilization of lecture rooms the teachers are now interchanging classes to hear certain lectures that have a commonality to all of their programs. The lectures are not being given in isolation with a teacher to a class but a teacher to many classes.

I want to emphasize these points because this has been one area that has really been growing very rapidly. In other words we have to move as fast as possible into more advanced-type use of the lecture room using electronic gear. We must definitely move into what I call a community-centered institution.

Now, in conclusion, I think that I would perhaps draw it down to the following ten points. I apologize if I eliminate some points. It is absolutely impossible to stress all of the points that should be given attention.

One, we have to use more the open-space concept. It might interest you to read a document recently put out by the Educational Facility Lab in which they tell very clearly that in 1950 our problem was to get open space and move the partitions. Now, the open-space concept is eliminating the movable partitions. We are using many different types of artificial barriers if the need is there. Where we were striving to get the open-concept in 1950 by utilizing portable components we now see the portable units being eliminated. You will, eventually, in the open-space concept have a large guilding that will protect from the elements.

The second idea I will call the machine input. What I am saying here very clearly by the machine input is that we cannot continue our present teaching methods and teacher/pupil ratio. We must utilize all of the electronic components available, machine teaching of all descriptions, the ability to allow the student to progress at his own rate of speed and so on. In other words, we have to take a page out of what our academic colleagues are doing and utilize it effectively for our own use.

Three, we must definitely start clustering shops and laboratories to eliminate duplication of equipment, facilities of all descriptions, storage facilities, and so on.

Four, we must definitely move to the utilization of variously designed lecture halls, which in turn will minimize the need for individual classrooms, separate shop, and laboratory for each individual instructor.

Five, we will have to place greater emphasis on the teacher preparation room. This is a very critical point. They must have an area where they can prepare their materials, leave their materials, continue their work on these materials, and develop the different models and components which they wish to utilize in their classes.

Sixth, along with open-space concept, we must make greater use of adaptability and flexibility in terms of the electronic units and components which will be utilized. We cannot have an open-space concept and then have it become static because of our failure to put in proper lighting, and/or electrical outlets for plugging in different instruments. When we talk about thermal and environmental control we find ourselves conditioned by the methods in which we have installed the mechanical units. We must look at this very closely. In other words, you can have an open space and defeat the purpose because of the lack of attention to this type of mechanics.

Seven, I'm saying each and every area must be designed with the understanding that we will accommodate both males and females. Immediately some people are going to say to me, "Are you saying that we have females enrolled in an automechanic course?" and I say to you, "Ladies and gentlemen, yes, we have. And we will have more." I look at the number of women that will be in the labor market in the near future and the role that they are playing. We have many outstanding women in the area of design today. There is no area that is "off limits" to them and this you must take into consideration. We have some outstanding women in industry today and there will be more.

The eighth one which I keep repeating is a community-centered facility to meet the needs of the people.

Nine, the initial design must take into consideration and include other agency needs that we referred to earlier.

Ten, the reason I put this tenth as I did earlier in the morning when I put it twelfth is I would like to leave this emphasis. We must develop without any question larger guidance and testing capability within each and every one of these facilities. This is an area where we have given much lip service to this concept but very little action. If we are going to meet the needs of all these people and take them as individuals from where they are and offer them the type of program that is needed to elevate them to where they have to go into the labor market and be properly acceptable, we must have a very intensive testing, guidance, placement, and follow-up program. This is an area we have sadly neglected. . . .

# LEADERSHIP IN FACILITIES PLANNING

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## The Need for a Unified Planning Approach

State-wide program planning of Vocational, Technical and Continuing Education programs in most states has been at best somewhat haphazard and fragmentary. For many years, the vocational education program was very limited in terms of meeting the many different occupational training needs of the labor force. Hence, new or expanding local programs generally established one or more of these training offerings without so much as a local field study. The same general situation existed in agriculture, home economics, distribution and office practice.

Many of the limitations in vocational education have been caused by the lack of funds to plan, establish and operate programs beyond these several basic occupations. Except for general promotion of vocational education in the early years of the Federally aided programs, local initiative largely determined the establishment of a program and the choice of occupational offerings. Ver little program planning was initiated at the state level and then only after a local community expressed its desire to initiate a program. Program planning consisted chiefly of looking at other programs and deciding to do likewise.

As the labor force has grown and diversified, and its needs have been more clearly identified; as the philosophy and practices of vocational education have broadened to tak into account the growing demands in agriculture related jobs, gainful occupations involving home economic skills, technician jobs, health occupations, sales and service jobs of many different kinds and office jobs; as the Federal, State and local funds have been substantially increased particularly in the past five years; and as many other educational agencies and training programs have begun to play an increasingly important part in supplying trained manpower, two conclusions are inevitable:

(1) The State Board for Vocational Education and the State Department of Education should play a substantial leadership role in state-wide program planning, and

(2) There should be developed and implemented an organized, systematic planning procedure in which all educational and training agencies can participate.

Only in this way does it seem possible that public and private funds can be used efficiently and effectively in meeting all of a state's manpower needs; that unnecessary overlapping and duplication of effort and expense can be eliminated; that all occupational and training programs can be properly coordinated to the end that they do not produce surpluses of trained persons in some fields and neglect critical occupational demands and that occupational education will become an economic asset in a state.

Occupational education programs of all kinds, public and private, are growing rapidly in the states. The demand for funds to finance the construction and operation of new and expanding programs is increasing tremendously. Other educational institutions and training agencies are also seeking increased public financial support. Therefore, it is essential that the State Boards should examine all of the elements in occupational education, and plan a total unified program.

All of the concepts and procedures described in new and proposed legislation lead to the planning of a total program of occupational education in the state. All of these are implied in the requirements of the new vocational education act, P.L. 90-576, The Vocational Education Amendments of 1968. Section 123 of this act dealing with new state plans makes it clear that each state will be expected to develop a state-local planning procedure that will assure the best use of funds in light of important training needs of all people as well as requirements of employers.

A state study should undertake to develop a "systems approach" to program planning, taking into account the following major factors:

(1) The existing vocational education programs,

(2) The supply of and demands for trained persons,

(3) The existing socio-economic conditions and trends,

(4) The available funds and resources.

The planning of a vocational and technical education program in its socio-economic environment is indeed a broad, complex problem. The many important aspects of the total problem cannot be ignored as they have been in the past.

Planning from a total system standpoint is not easy. It requires a high order of management leadership, organizational understanding and discipline. The systems procedure would require a sharp change in state organization and administration of vocational, technical and continuing education; an extensive in-service training of all state staff personnel; an extensive pre-service and in-service training of local administrative and supervisory personnel. In addition, there would be required close working relationships and coordination with all other state and local education agencies and with other state and local governmental agencies, especially those concerned with economic and industrial planning, growth and development.

Obviously, the planning of facilities and equipment for comprehensive vocational education programs in the future entails increased sophistication in the identification of priority occupational manpower demands and appropriate curricula to meet those demands. And in turn, it is just as obvious that increased sophistication means knowledgeable, highly skilled professional leaders of different kinds and mixes. In brief, facilities planning cannot be isolated from the total program planning activities.

The core of the leadership in all vocational and technical education is a combination of state and local administrators or institution heads who are responsible for the planning and operation of programs and who are accountable for the results or outcomes. Instructors, especially those who are experienced, who will be teaching in new program should, if at all possible, be consulted or even employed before the programs are initiated in order to capitalize on their background and experience. Instructors of shop and laboratory offerings should be especially valuable in the selection and placement of equipment.

In identifying the kind of responsible leadership needed in facility planning, the newly required State Advisory Council and, of course, the many local general and craft advisory committees should not be overlooked. These committees, both as groups and as individuals, have much valuable talent and competence to offer in planning activities.

It is extremely difficult to see how these leaders can carry out their responsibilities without some more systematic approach to state-level program planning which takes into account the total economic and manpower situation in a state or region. In the case of the Pennsylvania Study, it was decided early that in view of the peculiar regressive economic history of the State for a number of years, it was important to program planning to determine the so-called competitive posture of the State. By this is meant how the growth or decline of business and industry compared with that of similar and neighboring states and with that of the nation as a whole and what import this had for manpower development. In order to do this, it was necessary to engage the services of a skilled competent economist, who working closely with vocational education leaders selected and interpreted the important demographic and economic events which have the greatest relevance for occupational education planning. To sum this up, such a study enunciates three principal tasks:

(1) A study of the economic posture of the state in relation to neighboring states which compete for skilled manpower and new industry. In this respect, population trends, employment trends, and wage trends were analyzed and compared as indicators of the competitive status of the states.

(2) A study of the internal geographical changes in regard to the movement of population and employment within the state to demonstrate the degree of internal competition.

(3) A study of the shifting aggregates of employment to illustrate the competitive position of the different industries for labor.

Such action requires continued close consultation with Federal and State Departments of Commerce, and respective State Planning Boards and Commissions. It also involves State, regional and local industrial development agencies and persons and trade associations. Such agencies and people have much to contribute in program planning for the future, which in turn has meaning for the design and equipping of modern vocational education facilities.

Although this undertaking may seem somewhat complex and involved, it is this kind of interdisciplinary action and sophistication that needs to enter into vocational education facilities planning and the kind of talent and leadership needed to do it. Otherwise, vocational education may recede in leadership and simply wait for other agencies and leaders to move in.

Similarly, serious social problems of the disadvantaged and minority groups in a state or region can be identified by skilled, experienced sociologists with a view toward identifying and locating people who are badly in need of particular kinds of occupational education and training. The participation and contributions of practical social scientists to facilities planning are not to be viewed as frills or fads but rather as leading to specific recommendations for the design and equipping of a facility to meet peoples' various needs. Community Action Program and Housing and Urban Development leaders need to be tied into planning at the earliest possible stage.

Moving on in a kind of sequence, a necessary input to facility planning is reasonably reliable manpower supply and demand data, current and projected. Such data should be obtained for fairly specific occupational classifications on an annual and a five year basis.

The demand data would need to represent the total occupational training demand as a result of the withdrawals and growth in the labor force for the whole state and for the particular area to be served by a new facility. The supply data should be an annual input representing the total number of trained person produced by occupational classifications, by all major training agencies, institutions and programs. The difference between the demand and supply data would represent the estimated annual net training needs. In this way, facility planning could be directed toward priority programs that are in fact attuned to realistic job opportunities.

An additional input should be noted here in the form of information and data on new and emerging occupations. In most cases this necessitates an extensive field study of the occupational pattern of new and fast growing industries and services.

Here again, it is obvious that the skill and experience of occupational and labor market analysts are needed. At both state, regional and local areas, the direct assistance and cooperation of the Federal and State Bureaus of Employment Security are needed by the vocational education leadership. The Vocational Education Amendments of 1968, P.L. 90-576 anticipate and, in fact, require the cooperation, involvement and contribution of appropriate staff members of bureaus of employment security in program planning.

Two key functions now absolutely necessary to effective planning are adequate research and a curriculum planning operation. Although there are various ways of establishing and conducting such important activities, some combination of college and university research and curriculum personnel and staff of a State Research Coordinating Unit should provide continuous service in the development of appropriate curricula and effective teaching methods. Here again a high degree of skill and experience is essential to making this kind of activity practical and meaningful. The joint work of such personnel should have the overall supervision of the state administration leadership so that research and curriculum development activities contribute directly to program and facility planning. Otherwise, these activities can result in an exercise in futility.

Although all of the preceding activities have been described as discrete items, it should be recognized that they need to be coordinated closely and carried out concurrently. It is not necessary that one activity be carried out completely before another, but it is essential that the information and data coming out of all of them be coordinated into a synthesis of a program and facility plan.

The sum of all of this is that a great variety of leadership is needed to plan programs and facilities wisely and effectively. The particular function of key state and local vocational education leaders is to identify and select the kind of persons previously described and to organize and manage their contributions in such a way that the best possible plans are designed and implemented.

# THE EDUCATIONAL FACILITIES CHARRETTE

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## Charrette Defined

An "Educational Facilities Charrette" is a technique for studying and resolving educational facilities development problems within the context of total community planning needs. The technique requires a majority representation of community resident and community leadership direction of a multidisciplinary group -- educators, planners, architects, engineers, economists, psychologists, business representatives, local public officials and students -- intensely studying community problems in open public forum to achieve creative solutions. Primary emphasis is given to educational facility and program as the natural catalyst for revitalization of the total community. The principal purpose is to arrive at implementable plans and solutions to community problems in a compressed time period. The charrette is kept practical and viable through commitment of local resources which leads to a high probability of implementation of charrette solutions.

## Charrette Purposes

There is a growing recognition that educational facilities and programs should be totally enmeshed in the social, economic, and physical vitality of communities. Increasingly society is asking that new schools be planned as community institutions, serving adults as well as children, performing social and cultural as well as educational functions. The concepts underlying this philosophy are that physical integration of educational facilities into the total fabric of the community will result in social and economic, as well as environmental, revitalization of communities for the public benefit. To improve education, we must integrate the whole social system rather than just modify the schools. This suggests that educational facility planning must become part of an overall strategy for community development and renewal, and that new approaches to coordination of public decision-making and planning procedures must be found.

The need for a new school planning procedure has become self-evident. The old ways simply do not result in schools that serve either education or the community well. The evidence is overwhelming that today no school can fulfill its functions unless the life of the school and the life of the community are so actively and intensely interrelated that one is the extension of the other. The "educational facilities charrette" is a unique planning process designed to create new educational complexes that serve as a focal point for the reviatlization of entire communities.

## Charrette Action

The assembly of community residents in dialog groupings with interdisciplinary professional, students, key public decision-makers, and private industry representatives is crucial to the creativity of a charrette and the creation of new "working partnerships" that bridge old credibility gaps. It is only through the total involvement of all parties that ideas, concepts, and value judgments can be confronted, tested, and resolved in public forum. Thus, the charrette approach lies in sharp contrast to the all to frequent occurrence of polarization of factions resulting from the development of plans and decisions in secrecy.

The time period is compressed into one or two weeks. Consequently, there is always present an atmosphere of hyperactivity and dialog taking place in a climate of creative combustion and confrontation of ideas that might, in other circumstances, lead to chaos. Under the conditions of the charrette leads to the conversion of negative energies into constructive purposes to focus and forge ahead on productive paths. Dialogs and discussions spill over into mealtime and living quarters. People suddenly dash off to drawing boards and writing tables as a dialog group is seized with a creative idea. Everybody becomes everybody else's whetstone. Every idea is developed and tested in open community forum.

## Charrette Pre-Planning

The formation of an effective charrette steering committee is probably the single most important step toward the creation of a successful charrette. The charrette approach to the formation of a steering committee is to openly promote an environment whereby community leadership will surface to form its own steering committee because of a commitment and belief in the charrette process, itself.

After the community has selected its own representatives, th remainder of the steering committee is formed by community invitation of key private and public officials to participate (i.e., officials at a decision-making level or their assistants). Other individuals may also be invited to participate in a non-voting, ex officio capacity; for example, State and Federal Government officials. Thus, the steering committee consists of a majority of community residents, plus representatives of public and private organizations directly involved with the community, and non-voting, ex officio members. It is in this manner that the charrette approach to creating a steering committee avoids the inbred bias of the traditional method of selecting steering committees (i.e., an organization in power appoints and covenes a steering committee), and permits the community involved to establish confidence and leadership in the planning process.

The steering committee should be organized and ready to plan for a charrette two or three months before the charrette, itself, actually takes place. The steering committee has five basic tasks:

- Elicit incremental funds from State and local agencies
- Promote public relations in the community
- Conduct pre-charrette workshops to define "givens" of problem
- Select charrette participants and leadership core
- Provide background materials and a live-in, work-in, 24-hour facility for charrette.

## Charrette Implementation

Creativity flourishes in a charrette, but always within the framework and focus of very real and concrete problems. A charrette is organized to result in community recommendations that carry insurance against rejection by any part of the power structure through direct participation of key officials who must approve public projects, and the constant monitoring of concepts and proposals in open community forum. Thus, the charrette process reduces to a minimum the likelihood of objections and obstacles that have already been encountered and overcome in the process itself.

In addition, the charrette process is checked and adjusted in nightly caucus presentations to the community-at-large, and at one stage of the charrette process the proposals are formally presented to a comprehensive jury representing the power structure and community leadership. At every step along the way the work and progress is subjected to searching scrutiny from every angle: community acceptability, design feasibility, political possibility, education relevance, cost, etc. What emerges is a plan that meets both the urgent demands of the community and the unavoidable demands of reality -- a plan that is implementable because of consensus and commitment.

Things are never the same after a charrette; the experience unites the participants, and the outcome changes the entire community.

The distance and the divisions between community and power structure, between school and community, are drastically reduced, if not bridged. For together they have produced a plan for community revitalization that is creative, comprehensive, and commands the support of the community it is meant to serve. Together people have started to plan not a cold collection of buildings, but a vital new environment, not isolated and apart from the community, but an integral part of it -- a shared environment of social, economic, and physical linkages between school and community. That is what charrette is all about!

## Charrette Advantages

A. Elicits community cohesion, confidence, and leadership in the direction of its destiny -- democracy in action. It fosters community leadership, community cohesion, community confidence, and community support.

B. Produces a high probability of demonstration that educational facilities are the natural catalyst for revitalizing communities.

C. Requires development of a working partnership between the community, the center of political authority, the multiagency bureaucracy, and the planner/designer.

D. Generates effective economy, and is in clear contrast to traditional proliferation of uncoordinated Federal, State, and local government funded consultative studies that end up on shelves -- unimplemented. Marshalls full use of resources already available -- with a minimum of direct cash flow.

## Charrette Funding

Incremental funds for conducting the charrette are usually committed by various organizations, including departments of education, public commissions, local agencies, and other public and private organizations. Commitments in kind by local government (i.e., key public officials, basic data, etc.) are as important to the success of the charrette process as commitments in dollars. In the overall, the charrette technique can be less expensive than the "contemporary" planning process, and infinitely more effective in its attraction of effective talent, scope of problem analysis, and arrival at creative, yet implementable solutions to community problems.

# SURVEY TECHNIQUE AND NEED STUDIES

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These devoted only to hearing about and talking about new things may consider the school survey antiquated and obsolete. Actually the school survey concept is resilient enough to encompass both well proven techniques and new ideas. A quick round-up made of available school survey reports of the past decade shoed that in each year more than fifty surveys had been published of all types and excellent quality. Probably the survey projects conducted annually number in the hundres; certainly they generate many new concepts.

## Basic Survey Techniques

The initial strategy in a school district survey is to analyze the problem situation and decide upon the divisions of the study. The question of determining a long range master plan for school construction has been studied so often that through the years very skillful techniques have been developed, and the divisions of study for such a survey are almost standardized. Generally the dividions of a survey of school building requirements will be as follows: community factors, educational program, enrollment estimates, evaluation of existing physical plant, study of school sites, financial resources, and recommended building program.

Only a few of the technical aspects of a school district survey will be mentioned in this connection, because our primary concern is with vocational education. Obviously maximum data concerning community factors will be of value in planning a vocational education program, since the philosophy is to meet the needs of the community and the individual. The process of data collection in a survey is usually on a cooperative basis with local school officials and a consultant seeking to leave no stone unturned. A comprehensive agenda of items is prepared in advance, and information is collected through agencies, documents, and interviews. Sometimes a local questionnaire is used to gather facts and opinions.

Certain parts of data collection require specialized observation. For example, a building and site score card is generally used for inspection of existing physical facilities. Enrollment estimation requires data processing, the survival ratio method applied to attendance records for the past five or ten years being most reliable. An enrollment study based on a census would be preferable for vocational education. Estimates concerning capacity of plant are quite variable depending on concepts of utilization, but fairly accurate space determinations can be made as to pupil stations and teacher stations for a given purpose. As the physical plant is inspected, the observer not only notes details as to required modernization and probable costs, but also considers alternative assignment of spaces.

Sites require particular study, for which purpose district maps are prepared showing highways, pupil residence, and land usage. It may be assumed that vocational education will involve school transportation. Financial resourdes require intensive study, since the costs will be spread over an extended period of years. For vocational education purposes, special fund and tax resources may be available.

With this brief introduction to survey methods, an orientation is needed as to how the recommendations can be formulated. We may presume seven broad fields of learning for which instructional space is wanted: language arts, social studies, mathematics, science, physical education, fine arts, and practical arts. Student activities relate logically to these fields. In addition the school buildings must provide general areas such as library, auditorium, cafeteria, foyers and commons, administrative offices, and other services. Vocational education is associated with practical arts. Practical arts is appropriate for all students, those who go to college or technical institutes, girls who will be homemakers, vocational students seeking occupational skills, and prevocational students in the middle schools.

The surveyor has the task of recognizing the different value systems of the respective fields of learning. He seeks to put first values foremost in assigning priorities for the building master plan of the school district over a period of years. He endeavors to show the building program as a sequence of steps with each project contributing to the ultimate objectives and goals.

## Vocational Education Survey

Preconstruction planning for a vocational education facility project, as a department of a comprehensive high school or as a regional vocational school, will require additional information and probably unique procedures. To embrace the total know how and value system, as well as secure sustained interest in the future operation of the vocational education department, the survey strategy could include the guidance of an advisory committee. In fact, since most occupations are in fields of industry, this committee could be an industrial advisory council representing various interests.

Background information for planning vocational facilities is available in government documents. The state and national region shuld first be examined since the young, trained working population incline to be mobile. (Real estate dealers say that average home ownership in many areas is five years.) Generally the site of a proposed vocational education unit is within the sphere of influence of a metropolitan area, enabling the planner next to make an intensive study of the occupation market for the congruent region. Public agencies may contribute additional information concerning industrial census, population changes, and local economic trends.

The proposed curriculum for a particular vocational facility project is a choice among alternatives. Consider the following titles of syllabuses published by a state department (New York State Education Department): business law, distributive education, home economics occupations, merchandising and management, automatic data processing, cosmetology, automotive occupations, plastics, horticulture, conservation, agricultural business, industrial arts. Often the curriculum begins with known subjects that the students have an interest in pursuing. But from the outset it is understood that the curriculum will continuously evolve and develop. This suggests a system of spaces involving major resource cneters, faculty deployment that enables direction and supervision of individual learning, efficient areas for conference and discussion, and flexible laboratory facilities clustered according to types of occupations.

The vocational education unit should be capable of operation separately from the adademic unit because it will operate twelve months of the year, and for additional (nightime) hours daily. It should be multi-scheduled in varying blocks of time and often available to clientele not enrolled in regular high school work. The plan should enable an efficient individualized learning system not dependent on adjoining academic facilities or schedule. The vocational education unit requires responsible administrative direction at all times and a method of cooperative planning.

Closer estimates of needed facilities can be obtained by a computerized simulation of the multi-scheduled vocational program. Considering many factors, teacher's time, individualized learning, cooperative planning, and given constraints, simulated schedules can be produced for alternative concepts and space assignment.

To place the objectives of vocational education in proper order is essential for success of the project. Probably the controlling demand is for occupational skills. This will appeal to more individuals and serve an ostensible manpower need of the community. Akin to occupational competence is citizenship and self-reliance of the occupational worker. However, more than half of the high school enrollment intend to go to college and they too want experience in the field of practical arts. Moreover, prevocational experience in the middle school years has proven both practical and exploratory. Thus the objectives of vocational education should serve many clientele.

## Major Demands

What then are the pressing demands to be considered in a separate vocational survey?

(1) The vocational education program should serve the total community. This includes the youth preparing to enter occupations, those intending to go to college, those who will transfer to a technical training institute, the housewife and the self-employed citizen, the range of abilities, talents, and interests, an opportunity for the school dropout, the retraining of industrial workers, and adult education.

(2) The world of changing occupations makes some skills obsolete and creates markets for other skills. Vocational education must include basic learning.

(3) Articulation with community colleges and similar educational agencies necessitates open cooperative planning. Experimentation as to the age level and appropriate institution for various kinds of occupational training ought to continue.

(4) Changes occurring in the community may exceed any educational provisions we currently foresee. For example, school organization may adjust to a 4-4-4 plan with students transported to educational centers on varying schedules; or consider the increase of technical resources for education--what space may be needed for educational resources in the future? Again will there be a resurgence of local pride and concern for local community services with which to identify?

(5) Vocational education needs to gain respect for the academic program. Many of the occupational skills rely on academic learning, which imply a closer integration of lesson planning. Practical arts instruction has tended to splinter and adopt different professional values. Actually the academic professional respects vocational education more than the reverse. A common basis of respect needs to be restored in the comprehensive educational program.

(6) Counseling, especially vocational counseling, has been quite superficial. A system of instructional counseling and assignment of learning tasks emanating from a vocational education resource center would challenge the previous non-directive trends of the counseling role.

(7) Vocational education requires learning laboratories of specialized types. The space per student station, the space per pupil enrollment, the ratio of instructors to pupils, the operating cost per pupil, and the total cost per pupil may exceed by 250 per cent or 300 per cent that for academic instruction.

From experience you are invited to add to this list of major demands in planning a vocational education program.

## Systems Engineering

A useful logic for the school surveyor is provided by systems engineering. Without going into all the definitions of systems, subsystems, environment, needs, and models, with which you are already familiar, consider the following diagram of the systems approach (Figure 1). The method is recognizable as the basic problem-solving approach of John Dewey except that the details of problem definition and hypotheses are explained in a more sophisticated way.

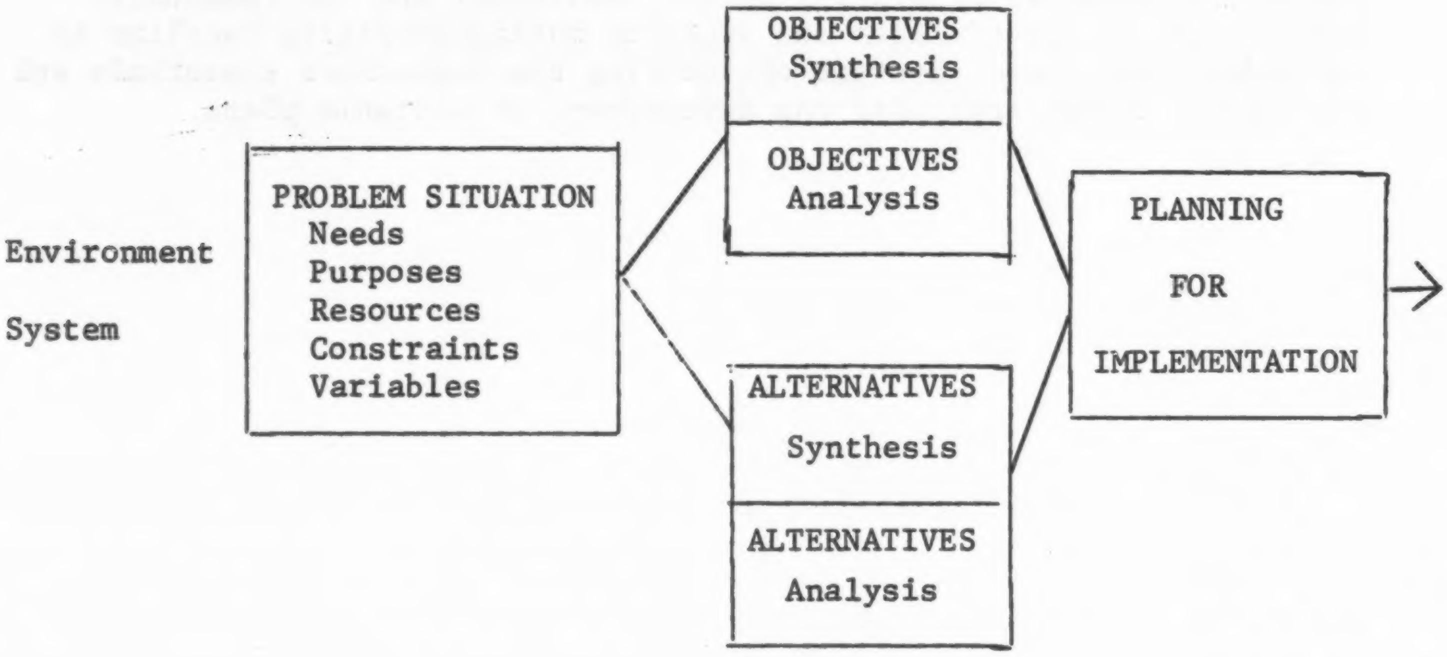
Environment
System
PROBLEM SITUATION
Needs
Purposes
Resources
Constraints
Variables
OBJECTIVES Synthesis
OBJECTIVES Analysis
ALTERNATIVES Synthesis
ALTERNATIVES Analysis
PLANNING FOR IMPLEMENTATION

Figure 1. Systems Logic in Planning

The problem situation in vocational education planning is very complex because it is derived from both broad environmental factors and relationships and from laws and practices that exist in the educational system. Much of the problem solution may already be provided for in existing resources, but additionally there are unmet purposes and needs which may be evaluated in terms of known contraints and potentially controllable variables.

This complex problem situation can be brough into clearer focus (in terms of the diagram) by identifying the objectives and alternatives. Synthesis of the objectives is a decision-making process. The objectives come from value systems and various demands or traditions. Expressed by skilled, knowledgeable persons the objectives chosen for the program will be workable and appropriate. However, analysis of the objectives adopted for the program may show that some are ultimate objectives are logically sequenced and aligned, and if means or alternative means are feasible to reach the intermediate objectives, then the ultimate objectives could be made attainable. An exciting feature of this analysis is that generally the intermediate objectives can be stated as measurable goals. The surveyor is thus enable to simulate the situation and test alernative plans to see which operations would most effectively achieve the projected goals.

Synthesis and analysis of alternatives accompanies the setting of objectives. Alternatives are of course synthesized from known patterns, or parts of existing patterns, or sometimes created for the particular situation. The analysis of alternatives has reference to controlling criteria judged to be acceptable. Is the given alternative more economical, durable, efficient of time, considerate of human values, and appropriate to the long range plan? Will it maximize the objectives, having consequences beneficial to the individual and the community? The process is one of facts and decision-making generally familiar to the school surveyor. Systems engineering has emphasized essentials and provided a usable logic for the development of suitable plans.

## PLANNING THE EDUCATIONAL SPECIFICATIONS — MASTER PLANNING

Dr. Wallace H. Strevell
Professor of Education
University of Houston

Since educational specifications will be discussed on a divided time basis, the following comments are restricted to master planning concepts. Master planning by definition is hierarchal in nature. One would expect an adequate master plan to be comprehensive, complete, long range, and coordinated with community development. To achieve these criteria it should allow for various alternatives and be viable to changing conditions. It should be well-documented for decision-making and assure a sound investment in terms of ultimate facility goals.

Actually to locate such an idealistic master plan in any school district would be a rare experience. The usual practice when a particular facility decision or project is due for consideration is to assemble, or as necessary construct, the required planning elements and documents for the purpose. Basically the needed guidance is a statement of established long range objectives, a knowledge of relevant facts and factors to which adjustment must be made, considering always the human consequences, and a concept of the performance stuandards for which an economical, efficient plan must be prepared.

Thus the master plan is an evolving concept that embraces decision-making at several levels. At the state level, the master planning appears as guide-lines. The directives include financial assistance and authorization, systems of leadership and accreditation, specifics as to courses, equipment, instructors, and certification, and often some rule of thumb measures concerning standards, location of facilities, safety factors, and minimum equipment. Any school administrator or architect will want to consult the currently controlling state laws, regulations, and programs.

At the school district level, a more or less complete master plan can exist in various available documents that are subject to study and revision. First is the educational program which includes departments of learning, type of faculty employed, prevailing practices concerning credits, schedules, organization, and time allocation, and policies as to size of building units, assigned purposes of particular school sites, and proposed adaptations to changing conditions in the school environment. Speficially we would look for such elements of the school district master plan as maps, estimates, proposals or surveys, financial projections, and architects' drawings. Now the school district master plan is open to criticism, and that may be a reason why it is seldom expressed in dogmatic form.

Future planning may be challenged by militant groups, by technological advances in education, or simply by a change in coordinating architect or school board membership. Several city school districts have recently published innovative long range plans for comprehensive area schools, educational park campuses, special resource units, and five or ten year building programs. Regional vocational schools are an example of such bold departure from the conservative add-on type of planning.

## Campus Planning

Master planning becomes tangible and realistic at the campus planning level. Many colleges and universities, for example, have engaged specialists in recent years to plan for total campus development. Conspicuous money-saving features of college campus plans have access and vehicle traffic patterns, parking geared to projected enrollments, central mechanical system, deployment of auxiliary facilities, expansibility of educational facilities, and coordination of aesthetic features.

Should public school vocational education facilities occupy a campus and thus benefit from campus master planning? A number of large vocational education units have been built as high rise stacks in costly, restricted, downtown city locations. Doubtless, they are well designed and efficient for their purpose. Would they have been improved by campus planning?

What needs to be considered today is growth ofpopulation, mushrooming city and suburban development, changing industrial technology, and the demand for more education. We have been recommending for major school sites a minimum of 40 acres. Our inner cities are reluctant to provide such acreage for schools. Yet industry has moved to large industrial parts of perhaps a thousand acres, and the trend of population to metropolitan suburbs has not abated. For elementary levels, a decentralized neighborhood service approach may still have merit. But the diversified curriculum and learning resources for older youth appear to necessitate student travel to campus centers (unless a learning system can be devised for decentralization, and realistic approaches to master planning for a growing, changing school system envision concentrated large scale campus development of the major, complex secondary schools including practical arts.

## Program Analysis for Vocational Education Facilities

Before the involving of faculty in the process of program analysis, consideration should be given by the school administration and vocational advisory council to the character and scope of vocational education. Of seven learning areas, language arts, social studies, mathematics, science, physical education, fine arts, and practical arts, the concern here is primarily with the field of practical arts.

This field embraces a wide range of interests. There is training wanted by the college bound student and the youth seeking direct occupational skills. There is prevocational education at the lower level of the middle school and continuing technical education at the upper level of transfer to a community college or technical institute. There is the wide range of ability, talents, and interests of total youth on the school district census. There are other clientele not enrolled for regular public school credit, the dropouts, the employed persons seeking additional skills, and the adult education group. A decision must be made as to which programs warrant prior development.

The departmental study outline (Form 1) suggests a means to engage a practical arts faculty in cooperative analysis of their projected program. Among the divisions of practical arts represented on the existing faculty may be business education, home economics, agriculture, industrial arts, and vocational-technical fields.

The outline calls for faculty decision as to "objectives," which may now be stated as goals. It calls for awareness of "recent trends" or state of the art. It want precise information for the architect concerning "activities" that may be anticipated in the new facilities.

Determination of "enrollments" and "courses of study" will require considerable outside information before long range estimates can be given. The faculty will be much concerned with standards as to "required space" and "utilization of space" because these involve an approach to learning methodology. Work space for students and work space for teachers warrants particular attention in planning vocational education.

The invitation to draw "space relationship" schematics is of value for conceptualizing and communicating the program. Among the ideas for representing space relationships[1] (refer to Appendix) are schematics composed of laboratory centers, activity cneters, storage and equipment centers, learning goal centers, project centers, and competency centers. A diversity of themes is possible through these simplified concept drawings.

To complete documentation of the faculty involvement stage of program analysis, a competent editorial review should be administered. For example, are the statements of objectives reasonably consistent?

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[1] Illustrative sketches in attached Appendix are from Physical Learning Environment for Teaching Home Economics, Occupational Education, Bureau of Secondary Curriculum Development, State Education Department, Albany, New York 12224.

BUREAU OF EDUCATION RESEARCH AND SERVICES
University of Houston Houston, Texas 7706

OUTLINE FOR DEPARTMENT STUDY OF EDUCATION SPECIFICATIONS

1. Department (brief statement)
2. Purposes of Department (general and specific as to grades)
3. Discernible Trends
4. Organization and Activities
5. Probably Courses Offered (enrollments by grades; number and size of classes)
6. Space Requirements:
    a. By subject fields and grade levels
    b. Types of spaces and gross square feet
    c. Number of classrooms
    d. Number of pupil stations
    e. Room characteristics
    f. Supplementary areas (gross square feet)
7. General Area Relationships (diagram)
8. Internal Traffic
9. Storage (amount, type, location)
10. Special Requirements (utilities, etc.)
11. Permanent Furnishings and Equipment
12. Alternative Utilization of Spaces

Figure 1

Are all areas of practical arts instruction adequately represented? Is there agreement as to space standards and instructional strategies? Are the equipment and learning activity needs clearly presented?

Normally, it will be found that only a part (possible a half) of the total required space is covered by departmental program analysis. The remaining area may be designated as "general purpose spaces." Data also need to be developed that will insure adequate decision-making and architectural planning for the following general purpose spaces: an attractive commons area where departments converge, with faculty and students making informal acquaintance; a spacious library-resource center that will grow with increasing usefulness; provision for storage of equipment and furniture not in use and general purpose storage; administrative center including guidance offices, first aid clinic, and facilities for independent multi-scheduled operation; foyers, corridors, loading platforms, etc., that will enable movement of large apparatus or material(in multi-story vocational units a freight elevator or ramp is indispensible); lavatories for school personnel and visitors; mechanical service rooms; and other functional general purpose spaces that are necessary if not shared with the academic unit, such as food services and large group meeting rooms.

## Educational Specifications for Vocational Education Facilities

Many writers consider program analysis an integral part of the educational specifications document, which may be defined as an officially approved communication to the architect. In this discussion, program analysis was placed ahead of educational specification writing because we believe that design decisions should be mainly controlled by the ultimate program concepts. However, the fact is that as cooperative study continues in the respective departmental subdivisions of the practical arts program there are generated many specific ideas concerning the nature and use of the proposed facility.

As suggested in the departmental study outline form, the faculty and staff are further invited to record such particulars as "internal traffic; storage; special requirements such as utilities, permanent furnishings, and equipment; and alternative utilization of spaces." The principle of setting performance goals rather than undertaking building design still holds true; the architect must be allowed and encouraged to practice his professional skills.

An educational specifications document will normally start with an introductory description of the intended program for vocational education. Then a considerable number of general considerations are stipulated. Some of the general information which an architect will require is suggested by the following outline:

1. **Functional relationship to academic unit**
2. **Facilities to be shared with academic unit**
3. **Student and instructor building capacity**
4. **Building access**
5. **Vehicle traffic (including school buses)**
6. **Traffic control (including deliveries)**
7. **Parking space requirements**
8. **Outdoors lighting and other environs factors**
9. **Instructional use of grounds**
10. **Administrative control of vocational facility**
11. **Loading platforms and accessories**
12. **Movement of equipment and materials**
13. **Air conditioning and healthful environment**
14. **Standards for illumination (power demands)**
15. **Security mandates**
16. **Lavatory requirements**
17. **Storage of furniture, equipment**
18. **Maintenance and operation services**
19. **Communication systems, signals, etc.**
20. **Special plumbing requirements**
21. **Safety provisions**
22. **Acoustical demands**
23. **Type of conference rooms and classrooms**
24. **Expansibility and flexibility of laboratories**
25. **Faculty workrooms and offices**

Suggestions are now in order concerning space flow concepts that the architect should develop. The curriculum may be conceived as clusters with conference and discussion, laboratory equipment, and subdivisions where individual or small group learning activities are scheduled. The resource library may be as unique to the practical arts program as experience indicates, some current ideas from learning systems being that projects can be planned, assignments originate, records kept, and counseling provided in a central resource area.

The citizenship aspect of occupational skills can be stressed with provision of commons, conference rooms, and other informal facilities. The administration facilities require careful study because of such objectives as year around building operation, cooperative planning of learning activities, hospitality to different age group clientele, and respect for the importance of academic learning.

Obviously the educational specifications document will then continue with the particulars of curricular sub-divisions and such estimates as can be furnished concerning enrollment changes and future trends.

## Cohesive Planning at the Local Level

The relationship of educational specifications to master plan thinking may therefore be described in terms of three documents: the survey, program analysis, and educational specifications.

The survey brings together the environmental factors and the education system, states the constraints and prevailing policies, estimates enrollments, trends, and instructional methods, studies the existing plant resources and financial situation, and suggests alternatives for decision-making as to importance and sequence toward desired goals. The survey provides guide-lines for choosing sites, conducting bond elections, ahd providing for community and individual needs.

Program analysis examines the future means of achieving objectives through the realities of student learning and instructional capabilities. It examines the alternatives of resource allocation, time, facilities, talent, and student interest that result in practical decision-making concerning the curriculum offering.

Educational specifications abstract from such studies the accepted particulars for communication to the architect. An architect will of course have access to all these documents, as well as other studies, conferences and technical sources, comprising in total the planning process.

Illustrative schematics selected from
THE PHYSICAL LEARNING ENVIRONMENT FOR TEACHING HOME ECONOMICS OCCUPATIONAL EDUCATION, Bureau of Secondary Curriculum Development, New York State Education Department, Albany, New York 12224

Figure 1.

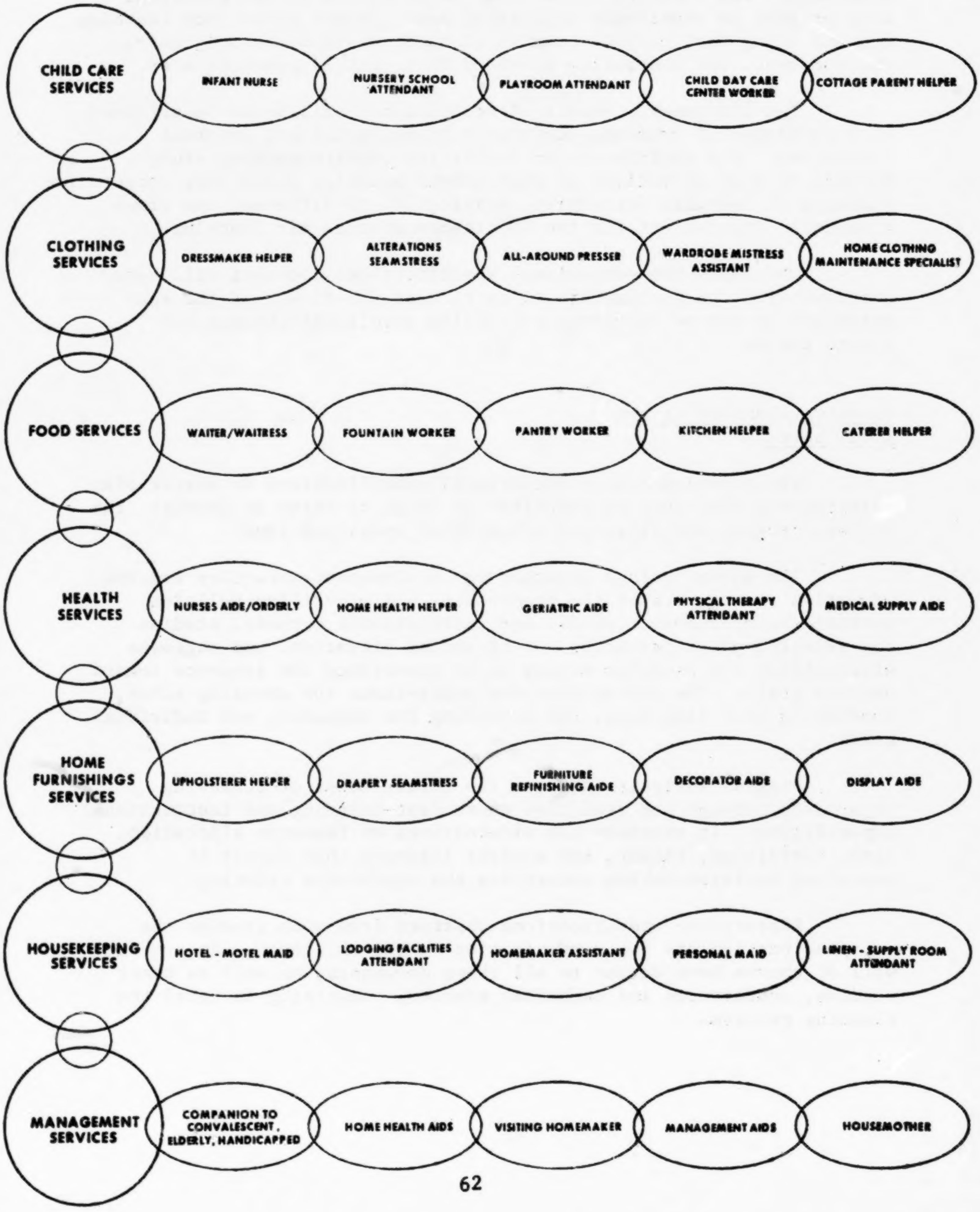

CHILD CARE SERVICES
INFANT NURSE
NURSERY SCHOOL ATTENDANT
PLAYROOM ATTENDANT
CHILD DAY CARE CENTER WORKER
COTTAGE PARENT HELPER
CLOTHING SERVICES
DRESSMAKER HELPER
ALTERATIONS SEAMSTRESS
ALL-AROUND PRESSER
WARDROBE MISTRESS ASSISTANT
HOME CLOTHING MAINTENANCE SPECIALIST
FOOD SERVICES
WAITER/WAITRESS
FOUNTAIN WORKER
PANTRY WORKER
KITCHEN HELPER
CATERER HELPER
HEALTH SERVICES
NURSES AIDE/ORDERLY
HOME HEALTH HELPER
GERIATRIC AIDE
PHYSICAL THERAPY ATTENDANT
MEDICAL SUPPLY AIDE
HOME FURNISHINGS SERVICES
UPHOLSTERER HELPER
DRAPERY SEAMSTRESS
FURNITURE REFINISHING AIDE
DECORATOR AIDE
DISPLAY AIDE
HOUSEKEEPING SERVICES
HOTEL - MOTEL MAID
LODGING FACILITIES ATTENDANT
HOMEMAKER ASSISTANT
PERSONAL MAID
LINEN - SUPPLY ROOM ATTENDANT
MANAGEMENT SERVICES
COMPANION TO CONVALESCENT, ELDERLY, HANDICAPPED
HOME HEALTH AIDS
VISITING HOMEMAKER
MANAGEMENT AIDS
HOUSEMOTHER

Figure 2.

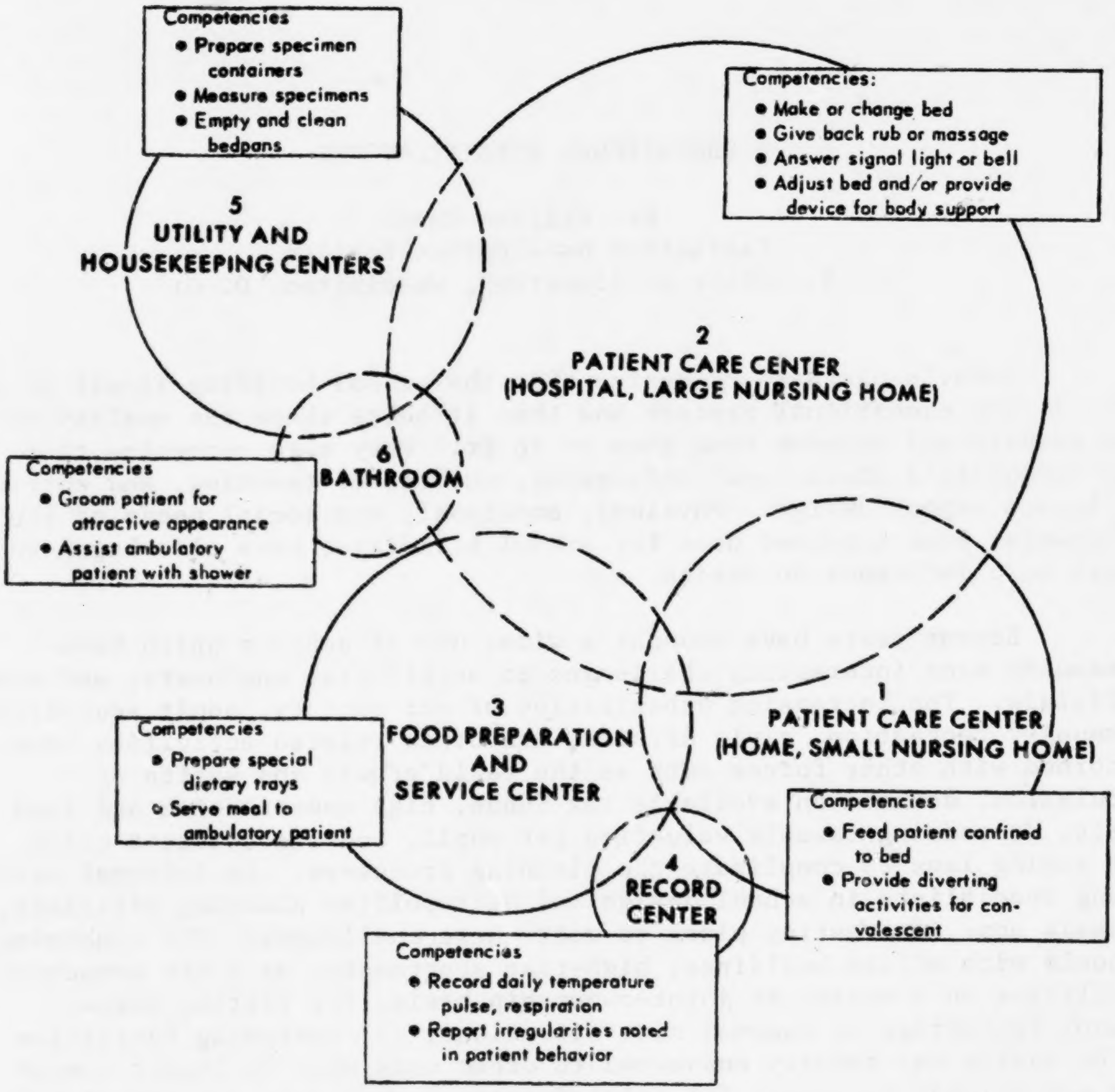
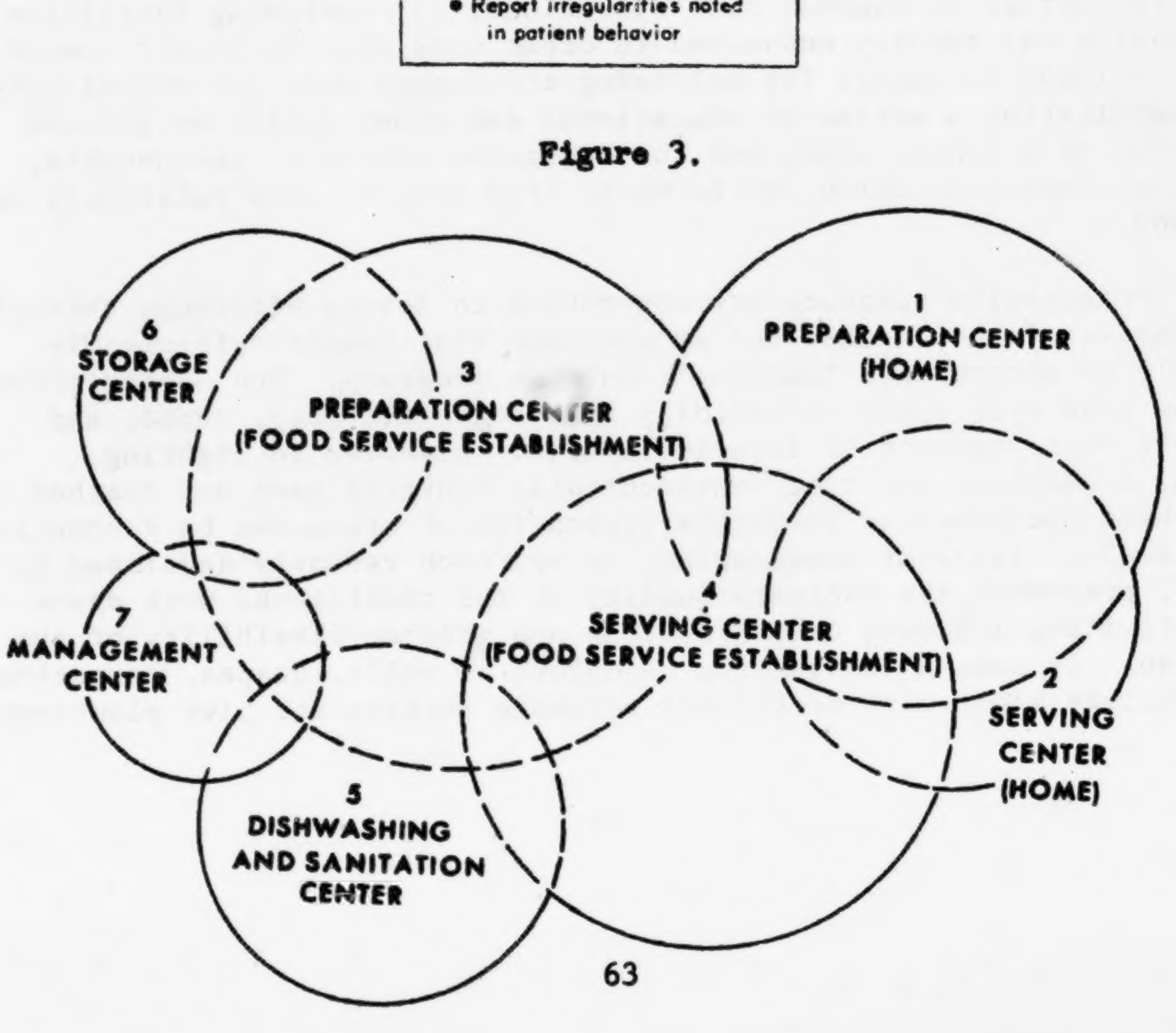

Competencies
• Prepare specimen containers
• Measure specimens
• Empty and clean bedpans
5
UTILITY AND HOUSEKEEPING CENTERS
Competencies:
• Make or change bed
• Give back rub or massage
• Answer signal light or bell
• Adjust bed and/or provide device for body support
2
PATIENT CARE CENTER (HOSPITAL, LARGE NURSING HOME)
6
BATHROOM
Competencies
• Groom patient for attractive appearance
• Assist ambulatory patient with shower
1
PATIENT CARE CENTER (HOME, SMALL NURSING HOME)
3
FOOD PREPARATION AND SERVICE CENTER
Competencies
• Prepare special dietary trays
• Serve meal to ambulatory patient
Competencies
• Feed patient confined to bed
• Provide diverting activities for convalescent
4
RECORD CENTER
Competencies
• Record daily temperature pulse, respiration
• Report irregularities noted in patient behavior

Figure 3.


6
STORAGE CENTER
3
PREPARATION CENTER (FOOD SERVICE ESTABLISHMENT)
1
PREPARATION CENTER (HOME)
7
MANAGEMENT CENTER
4
SERVING CENTER (FOOD SERVICE ESTABLISHMENT)
2
SERVING CENTER (HOME)
5
DISHWASHING AND SANITATION CENTER

# EDUCATIONAL SPECIFICATIONS

Dr. William Chase
Facilities Development Section
U. S. Office of Education, Washington, D. C.

Today's planners recognize that the school building itself is a tool in the educational process and that it helps shape the quality of the educational program that goes on in it. They also recognize that the community's educational philosophy, methods of teaching, and curriculum influence school design. Physical, emotional, and social needs of the occupants, plus expanded uses for school buildings, have also begun to exert more influence on design.

Recent years have brought a wider use of schools which have presented many interesting challenges to architects, engineers, and school officials. The increasing urbanization of our society, adult education, community recreation, civic affairs, and other related activities have combined with other forces such as the rapid growth and shifts of population, demands on available tax funds, high construction and land costs, decreasing taxable valuation per pupil, and inconsistent codes and zoning laws to complicate the planning processes. An informal survey among specialists in school design and metropolitan planning officials, reveals some interesting plans to meet these challenges: (1) combining schools with office buildings, high-rise apartments, or other nonschool facilities on a rental or joint-ownership basis; (2) fitting compact school facilities to unusual site situations; (3) designing facilities to be easily and readily converted to other uses when no longer needed for educational purposes; (4) utilizing air-rights over the school site; (5) consolidating a series of educational and other public or private facilities on a single site; and (6) designing portable, demountable, or mobile classrooms which can be moved from site to site relatively easy as needed.

Progressive planners are attempting to design buildings that will fill immediate school needs and at the same time remain sufficiently adaptable to accommodate tomorrow's unknown programs. One design effort provides long open spans of building area to permit easy, rapid, and efficient rearrangement of interior spaces. Advances in lighting, heating, acoustics, and other environmental controls have now reached a point where necessary or desirable separation of areas can be accomplished quite simply. Interior landscaping, an approach recently developed in Germany, preserves the intimate quality of the traditional work space while providing improved communications and greater flexibility of the open plan. It uses a combination of colors of walls, drapes, carpeting, and furniture along with occasional portable screens and live plantings to enhance the feeling of spaciousness. All furniture, including file cases and desks, is fitted with castors so it can be readily moved about. This concept, already in use to a limited extent in office buildings, has great possibilities for the school building of the future.

## Innovations and Modifications

The architect, and particularly his specifier, must be aware of the variety of innovations and improved modifications in school furniture, equipment, and learning aids which appear continuously as if from an assembly line. Without a doubt, many of today's standard items of equipment will soon be completely outmoded. Remote controls have already reduced the need for wiring and connections in certain kinds of electronic equipment used in language laboratories. A language student is able to don a headpiece and walk about freely while tuned to his lesson. His instructor can also tune in on his responses with additional remote controlled apparatus.

Experiments are being conducted with new kinds of equipment and ideas which may do away with the need for traditional chalkboards and tack boards. The application of the laser beam, the use of promising new materials and recent electronic developments may eventually eliminate the need for typical electrical wall outlets in classrooms. Increased emphasis on building materials and systems based on performance specifications also challenge the architect. Implicit in all of these developments is, of course, the need for daring and advanced thinking in school building design.

## Educational Specifications

Much effort has been devoted in the last several years to the improvement of the planning processes by which educational facilities are conceived. One technique or process which has proven to be especially significant is the written description of educational activities and requirements which the school building should accommodate. This document, more familiarly known as "educational specifications," is the written communication from the owner-- the board of education -- to the architect or designer. It is from this that the architect can do his preliminary sketching, and layout work much more effectively.

There is no set form for educational specifications nor does one seem desirable as building programs vary from community to community. The necessity for minute details in one community may not be justified in another. Likewise, the architect may be continuously employed by one district and only intermittently employed by another. The main thing is to assemble as much pertinent information as possible regarding each project and then condense it into a form which can readily be studied by the architect. A good set of educational specifications for a particular building describe:

1. The activities to be housed
2. The number and nature of the occupants or users
3. The spatial relationships of the instructional, administrative, and auxiliary areas.
4. Space requirements for each of the areas above
5. Furniture and equipment to be housed
6. Special environmental provisions

In addition to the more comprehensive planning concepts usually incorporated in the document, miscellaneous information is also provided which is especially useful in detailing architectural specifications. Included are traffic patterns, both the internal and external, storage space requirements, provisions for custodial systems, floor materials in special areas, inter-communication bell and clock systems, special mechanical equipment needed, etc.

It should be emphasized that a total long-range master plan of educational needs for the entire community should be completed and available prior to the development of educational specifications for the individual buildings. This includes the overall philosophy of the educational program in the community, administrative and supervisory policies, location and organization of the schools, staffing patterns, population and enrollment trends, and other operational procedures and policies. The value of this is readily seen in such a supposedly simple board of education policy of changing the maximum class size from 30 pupils to 28 pupils! Such an action in a large district would cause a drastic revision in classrooms needed, school design, and building and room utilization. A comprehensive study of this type would also recognize changing concepts of learning, new developments in teaching tools and techniques and expanding educational programs to include preschool and adult training and retraining.

## Cooperative Planning

In recent years there has been a growing recognition that educational programs and facilities are inextricably intertwined in the sociology of the city. Increasingly, society is demanding that schools be planned as community institutions, serving adults as well as children, performing social and cultural as well as educational functions, and operating around-the-clock twelve months of the year.

It is important from a facilities planning point of view to recognize the changes that have and are taking place in the metropolitan areas where the bulk of the educational facilities design problems exist. A brief review would include: the development of mass transportation, which made it possible to work in the cities while living in the suburbs; the migration of medium-income families from the city, and the migration of low-income families from the rural areas to the cities; the increasing shift of economic activity from the central cities to suburban areas; the concentration within the cities of racial minority groups creating economic and racially segregated ghettos; and finally, an explosive technology that relegates unskilled workers to low wages and unemployment.

The nation's schools cannot be themselves resolve these critical problems but they can contribute to the resolution of them through proper thought and planning. To achieve this end professional planners and local citizens will be compelled to coordinate their efforts and thoroughly analyze the interrelationships among education, health programs, recreation, employment programs, housing programs, et cetera. While education programs and facilities represent only one component of a comprehensive effort, it is well recognized that education must provide the central focus and thrust of any successful program. It, therefore, behooves the architect, the educator, and other planning authorities to coordinate and integrate their total planning processes to provide the kinds of facilities which will meet the needs elicited. The philosophy, objectives and aims of the entire community in which the new schools will serve are important in the development of the educational specifications and eventual facilities design and utilization.

The uniqueness of the vocational-technical education program is such that the requirements for it present distinct design challenges to the architect. Many of these challenges are quite unlike those found in the usual academic education program. Special shops, laboratories, storage spaces, and other facilities -- together with a wide range of equipment needs appropriate to the special shops to serve a wide variety of students with many different needs and aspirations on a practically round-the-clock basis -- demand all of the creative and artistic talents an architect possesses.

Basic considerations for planning vocational-technical education facilities about which the architect should be concerned involve both the site are based on its (1) size, (2) location, and (3) suitability for development. The site should be sufficient in size to provide space for present and future buildings; outdoor instruction and recreation; parking for students, faculty, and visitors; roadways, walkways, and service drives; and site beautification. The site should be located so that it is readily accessible to drive-in traffic; is reasonably available to needed utilities at a reasonable cost; is free from excessive noises, odors, smoke, dust, and congested traffic; and is coordinated with community planning. In terms of site development, there should be provision for the placement of the building, the drives, recreation areas, and parking spaces in proper relationship. Provisions should be made for safe approaches to the site and for landscaping.

A prime factor in the planning of facilities for vocational-technical education is the realization that each of the areas included has specific requirements which must be met. Building design is, then, an expression of how the problems of educational program planning have been solved.

In addition to design considerations, the architect must be concerned about the following:

(1) Program considerations, including the need for general lecture rooms, laboratories, shops, preparation rooms, project and materials storage, library and resource materials, and classroom equipment and furniture.

(2) Administrative considerations, including such supportive areas as private and general offices, guidance, counselling, and conference rooms, health clinic, cafeteria and food services, personnel records storage, custodial and maintenance shops, central receiving and storage rooms, drinking fountains, rest rooms, and corridors.

(3) Environmental controls to provide proper heating, cooling, and ventilation to regulate room air temperature, humidity, purity, and distribution; acoustical treatment to control or minimize sound transmission in and between classrooms, shops, laboratories and other areas; and balanced electrical lighting, natural light, and interior wall, floor and ceiling finishes.

(4) Auxiliary needs, including electricity, gas, and water, sewage and other waste disposal; inter-communication system; program clock, emergency bell system, and closed circuit television.

(5) Area and space relationships to facilitate traffic flow, reduce noise and confusion, and to complement program planning; to separate noisy areas from other areas, to provide for the ease of movement of equipment and supplies; to zone various rooms or areas for independent use as needed for desired.

It should be clearly understood that educational specifications are completely separate from architectural specifications. The latter are the technical aspects of materials, spaces, and design, and are the responsibility of the architect. A further distinction between the two is that the educational specifications are a means of communication to the architect in his initial design stage while the architectural specifications become a vital part of the construction contract documents. The detail and thoroughness of the architectural specifications are dependent upon detailed and thorough educational specifications to point the direction.

The development of educational specifications is essentially an educational task, and is to be done by or under the leadership of the educator. This is not to say, however, that the architect should not be involved in this stage of the planning. As a matter of fact, the architect can and should be a valuable partner in the total planning enterprise, serving as a technical consultant to the educators, enlightening them on building code requirements, construction cost estimates, and design concepts.

This interaction also enable the architect to gain a much better understanding of the purposes, requirements, and limitations of the buildings under consideration. He can combine these ideas with his own professional experience in planning the building. His contacts and awareness of the larger comprehensive demands of the community offer him additional opportunities for creative expression in school design.

# PLANNING FOR THE TOTAL SPECTRUM OF NEEDS

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School Planning Laboratory
School of Education
Stanford University

Dramatic changes are reshaping education as well as everything in our social environment today. Our society is not only changing, but it is changing at a faster rate than ever before. Radical change, as exhibited by the growth in population and scientific knowledge, is penetrating deeply into the fundamentals of nature and life itself, opening fascinating new worlds, and creating problems. Problems in planning for the modern society, especially in such far-reaching institutions as education, are rooted in tradition and deep emotional feelings.

Planning for the future depends largely upon cooperative activities, effectively organized. The question is not whether, but how to plan. Who decides, by what means, and for what purpose? What criteria of judgment are used? What power is used to persuade or enforce conformity with them? There are many problems to be solved and a long way to go before education will have reached the levels of modernization and productivity already achieved by many other parts of our economic and social environment.

Our culture is a composite of the past. It is the assimilation of history, art, and science as passed on to us through the centuries. Each of the objects around us has a point of origin in the past, but we have no comparable link with the future. Instead, our concept of the future is a concept of continual change. And, there is no business or institution which depends more on this concept than education. Businesses are used to planning ahead for at least ten years. But even ten years after our students begin school, most of them will still be pursuing their education.

Still another problem educators face is the occupational outlook. Up until now, people trained for a given profession and expected to stay at it throughout their working lives. Yet, within the lifespan of our younger generation, the notion of serving in a single occupation for a lifetime is antiquated. Some 70 per cent of the skilled trades in American manufacturing in the year 1900 do not exist today, and a large portion of today's skills will become obsolete within a very short time. Occupational needs are changing so rapidly that individuals must look forward to three or four intervals of retraining during their careers just in order to keep up with their professions.

Let us for a moment look at some figures in areas affecting education. The enrollments will continue to increase, except for a short leveling off at the elementary level. The number of births rose sharply after World War II but has dropped off since 1961, causing the rate of growth in the elementary level to decline. And yet this slight recession in the growth rate still meant that more than half a million additional students entered school this year. The peak of the post-war baby wave is now passing through high school. Enrollment at this level jumped by nearly 3 million in the last five years and is expected to increase another 2 million in the coming five years. Junior colleges and universities are packing students like sardines in a can in their battle to keep up with the increased enrollment. In the last five years, enrollment in higher education increased 1.8 million, and the coming five years expect to see the same amount of gorwth, bringing the enrollment up from 3.6 million in 1960 to over 7 million today.

The population shift to metropolitan areas continues. In 1790 our first census showed that 95 per cent of us lived in rural areas. And, as recently as 75 years ago, two out of three Americans lived in the country. But in 1960 more than 63 per cent of the population lived in the greater metropolitan areas. In looking at the projected population growth for the next few years, we find that 50 per cent of the growth will occur in approximately 20 metropolitan areas. Population shifts of this magnitude have important consequences for education. More children are being educated in the better quality programs demanded in the metropolitan areas. In order to accommodate the migrating population, new facilities must be created for demands far beyond those based upon population growth alone.

Today we see a team emerging made up of four groups - the educator, the architect, the contractors and the manufacturer. Although this presentation is concerning itself with the educator, architect and contractor, as we review the important slot that industry must play in the preparation of component parts for some type of a building system, the role of the manufacturer can't be minimized.

## The Educator

Everyone should have a speaking acquaintance with the education program, current and planned. It is from this knowledge that you can make a substantial contribution in the area of master planning and educational specifications. The ability of most of us to become acquainted with the modern tools of teaching and learning is appalling. Many facilities are planned throughout the world today without the benefit of educational specifications. Here is where we, as educators, have failed. Few architects have been provided a satisfactory program to use in formulating even beginning-design concepts. Too frequently we give little, if any, thought to the real function that is to be carried out by the facility. In many cases, when written information is furnished, it more appropriately represents what has taken place in the educational program in the past and reveals little as to what probably should be done in the facility in the future. It is difficult to obtain sufficient funds to plan facilities, but much more difficult to obtain money to plan for the facility.

We, as educators, have been unfair to architects in that we have not been furnishing them with the educational problem. However, we are quick to criticize their solutions when it is too late to change the design of the structure. Too many facilities are being awarded architectural prizes with little if any attention given to the functional aspects. This is no fault of the architect for he is seldom given adequate educational information with which to plan the building to accommodate the program.

## The Architect

The architect is a key member of the team. In fact, he is the middle man and a very important one. Although he has often failed to sell the public on what architecture really is, he has been successful with designs that have made educational facilities attractive to children as well as expressions of pleasing designs to the communities being served.

It is evident, however, in too many instances that present and future maximum utilization has not been considered in educational facilities at all levels.

If architects, as a group of talented creative professionals in their field, would accept commissions with less enthusiasm for designing educational facilities if the program is not available, everyone on the team would profit.

The era of systems has added many pros and cons regarding creativity and design. Architects complain about their creativity being stifled by the systems approach; however, many school buildings designed prior to the systems age often do not exhibit creativity. Church designs in the past few years are indicative of the willingness and even desire on the part of lay persons to depart from traditional designs of yesterday.

## The Contractor

The producer of the final product is often the victim of the mistakes and misunderstandings of the other two partners on the team. Let me hastily add that upon rare occasions the contractor also adds to the confusion.

Again we run the spectrum (as it is viewed by the client and the architect) of the best and the least desirable. It is through the workmanship of the contractor that the architect views the completed project with pride or despair.

It has been interesting to see certain contractors gain in prominence and prestige in the educational facilities building over the past fifteen years and others pass out of the picture. This is true in all fields. One wonders what Ford, Chrysler, and General Motors had that Dort, Star, Stutz and the Cord lacked. The ability to keep ahead of the pack seems to be the key. Cutting six inches off the end of a 2 x 4 to make it fit apparently is too expensive today. It isn't that piece of wood that counts, but the other hundreds of pieces that must have the same treatment that results in a waste of natural resources as well as unproductive time.

The contractor too must be alert to what is happening in the systems approach to planning. We are well aware of the jurisdictional and other labor problems involved in venturing into different ways of doing things, but then time alone is going to force all of us into taking a new look at everything we are doing.

I have brought along some materials that reveal some of our thinking as well as that of others in the area of systems.

It is gratifying to attend pre-bid conferences and listen to contractors who contribute well conceived ideas as to how economies can be achieved by architects, owners, and manufacturers. The contractors have demonstrated great initiative as well as skill as they put together the complicated structures they are asked to build today.

The growing complexity of the communications systems alone is a challenge to the most skilled electrical and electronic specialists.

New teaching methods are evolving. The lack of adequate teachers, enrollment growth, the larger consideration for students as individuals, new technology, and retraining demands have made it necessary to make new changes in the conventional methods of teaching. In the coming years we are likely to see a continuation of the recent curricular reforms. The major curricular reforms have produced an updating and upgrading of course materials and have developed techniquest for more effective teaching with those materials. They have placed knowledge and the methods of obtaining it at the center of the school's activity. They have offered possibilities for providing instruction that is effectively geared to the individual, to his learning capacities and interests, and to his personal problems. They have offered possibilities for improving a school's effectiveness through the organization of instruction.

Everyone realizes that education costs money, but can we afford not to participate in the economic benefits of a sound educational system? Centuries ago Confucius said: "if your plan is for one year, plant rice; for ten years, plant trees; for 100 years, educate men." M. J. Rathbone, chairman of the board and chief executive officer of Standard Oil Company (New Jersey), in a publication entitled "Human Talent: The Great Investment" stated: "The most important capital that any economy possesses is the skills which people carry around in their heads." Expenditures have grown from around $10 billion in 1950 to over $60 billion today. Thousands of local tax elections have authorized increased school property tax rates in recent years, and state legislatures have devised means of raising funds in production centers and redistributing them to areas where youth is being educated. The Federal government is helping in a significant way to solve the economic problems of financing education. During the fiscal year 1968, more than 4 billion in Federal funds flowed through the U. S. Office of Education to schools and colleges. This is a real boon to education, and in the coming years this amount is going to grow and provide an incentive to new program and facility developments.

The problems of increased population, retraining, technology advances, occupational changes, and problems in decision-making in education are causing the multi-faceted developments in this field. We will see the educational programs, methods and equipment of yesterday become obsolete and be discarded in another decade. However, the building structures designed to house and facilitate current and future programs will remain with us for a long time. It is, therefore, of utmost importance that facilities be designed for the maximum amount of flexibility to accommodate unknown future programs. The end product represents the successor failure of the cooperative venture.

To appreciate the problems in facilities design, one has only to review the changes in education brought about by evolving teaching methods, implied by the terms "Team teaching, mass instruction, small-group instruction, listening centers, learning laboratories, study carrels, electronic classrooms, study shell centers, teaching machines, resource cneters, and audio-visual centers."

These innovations have reshaped the educational facility. Where once a building was a large box filled with equal-sized smaller boxes called "classrooms" today, the learning area is encompassing great zones of space which professors and teachers share, or divide into subspaces according to the number of students, the amount of time, and the nature of the learning activity. Educators are clamoring for flexibility of space, for new auditoriums that can be immediately divided into classrooms and lecture studios, and for classrooms which can, on a moment's notice, be converted to larger or smaller spaces.

The school auditorium, long regarded as a luxury item in many a school construction budget, gained a new image of practicality and fiscal respectability in September, 1961, with the opening of a new auditorium at the Boulder City High School in Nevada.

At the same time, new avenues were opened for the design of theaters and auditoriums of all types - school, college, community and commercial.

The Boulder City project demonstrated that auditoriums and theaters could be divided successfully by operable, sound-retarding partitions to create spaces usable for purposes other than drama or assembly. This meant that the school could afford an auditorium, since the same space could be divided into three instructional areas. In the process, the need for five conventional classrooms to meet the projected enrollment increases was eliminated.

Even before the Boulder City project was completed, other communities across the nation began to look to divisibility as a soultion to the problem of obtaining assembly and theatrical space economically. Five years later, it is estimated that as many as 100 divisible theaters and auditoriums either are in being or are on the drawing boards.

Many are direct adaptations of the Boulder City concept. Some, reflecting new trends in instructional methods, are designed to accommodate heavy use of audio-visual devices. Still others, particularly in the colleges, are intended to house several of the performing arts in the same hall; in these, instructional use is secondary.

As educators, architects, and contractors struggled with the technical problems of divisibility, significant gains were made in the mechanics and acoustics of operable partitions and in the design of the halls in which they are employed. In short, the divisible theater/auditorium has come a long way since Boulder City.

A fairly recent E.F.L. report, "Divisible Auditoriums" is a reading must for those interested in learning how a number of communities throughout the country are dealing with this complex problem. This report is not intended to be comprehensive. The installations reported on are those that appear to be landmarks in the evolution of the divisible auditoriums, not necessarily those that represent the highest development of a particular approach to divisibility. A number were designed with E.F.L. assistance.

The final product, then, is a collection of ideas, all of them fresh and original in their day, that have been pivotal in the development of the divisible auditorium and the divisible theater. Hopefully, any or all of these ideas will provide helpful additions to communities and institutions as they plan better facilities for assembly, drama, concert, dance and education.

An educational facility cannot fulfill its long-term obligation, however, if flexibility does not extend to structure, lighting, air-conditioning and other building elements. The modular approach to building systems has provided one solution to the problem of flexibility because it integrates a variety of these elements. While the use of building modules may not in itself be a requirements, many problems associated with coordinating the various building subsystems can be avoided by using modules, and more importantly, the degree of flexibility increases in buildings using modular construction. This is especially evident in the School Constructions Systems Development System, commonly known as SCSD, developed at the School Planning Laboratory at Stanford University under the sponsorship of the Educational Facilities Laboratories. This project, incidentally, is an excellent example of cooperation between architects, contractors, manufacturers and education. In a period of two years, California school districts constructed over 2 million square feet of schools at a cost of #30 million using the system componenets and providing facilities superior to the conventional school. Schools have been and are being constructed outside of California using the system components in part or in whole, and other areas are forming consortiums for volume purchases. Probably with more research we would discover that although there were no major financial savings, that time of construction could be recognized as a major savings as similar systmes are planned.

The educational facilities of tomorrow must be planned as tools for learning, where teaching is helped and not hindered by the facility. Large spanning structures are needed in education. The present outmoded egg crate space arrangements are costly and defy most of the learning principles we are acquainted with today.

Of the newer developments which have shown promise in meeting some of the new educational demands is the use of educational media, including the various audio-visual aids. It is evident that books and other printed materials will always be needed. It is equally evident, however, that a much broader range of instructional resources must be available. There has been considerable technical advancement in the hardware through cartridge loading, self-threading projectors, and remote push-button control. This has been augmented with new curricula, involving texts, guides, achievement tests, transparencies, slides and films. In the area of more sophisticated quipment the developments are slow. The use of so-called teaching machines is minimal and except for a small number of pilot projects, some of them very well publicized, the use of computers for instruction in the schools is close to zero. At present, and for a number of years to come, the cost of such instruction on a large scale is prohibitive. It is much more likely that the coming years will see development of technically simpler and less expensive pieces of equipment which can perform the same basic functions in the learning process as the computer, limiting the computer use to the actual program design. Stanford's proposed Research and Development facility is demanding that 30 per cent of the required budget be used for electronic equipment to assist the teacher and the learner in researching the learning process.

As we look down the road and realize that every effort must be made to create usable facilities in a minimum space of time, we should welcome the growing evidence that team work is a must.

Although we educators, architects and contractors will be changing our roles, no doubt more and not fewer team members will be added. Society is becoming more complex and our jobs are not going to be as simple as they have been in the past.

# CONSIDERATIONS FOR LABORATORY PLANNING

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This presentation will delve primarily with one facet of what we term "educational specification," that is, the particular considerations in planning vocational-technical laboratories.

Those with experience in vocational-technical education have seen and perhaps suffered with facilities so designed as to make it difficult or impossible to achieve the objective of a program. Inadequate space; unsafe or inefficient equipment arrangements; a lack of or poor auxiliary services, required power, lighting or ventilation; insufficient storage space; and even the complete omission of other important features necessary to conduct an optimum program are complaints frequently heard.

Problems that usually result in planning educational laboratories can be attributed to poor communications between the educator and the architects and engineers. Hence, the need for more systematic educational planning for school facilities.

The Center for Vocational and Technical Education at Ohio State University outlines the following six guiding principles for planning facilities to house occupational preparation programs. It suggests that educational programs and facility decisions be consistent with these principles.

1. The educational program is the basis for planning space and facilities.

2. Space and facilities should accommodate changes in the educational program.

3. The program must serve the needs of a variety of groups in the community.

4. Space and facilities for the program can be extended through the use of community resources.

5. Safe and healthful housing must be provided for all students.

6. Space and facilities for occupational preparation programs should be considered in context with the total educational program of the institution and the community.

## Preparing Educational Specifications

Assuming a survey has been made you know whom you are to serve, where you are going to do it, how many pupils are to be served, and what the curriculum is to be, one may proceed to work on educational specifications considering the aforementioned principles and remembering that these specifications somewhat insure that you get what you want. It is at this point that the faculty should be involved in planning as well as lay advisory groups reflecting the programs to be offered in the facility.

Knowing that the curriculum dictates design -- a prime factor in the planning of facilities for technical-vocational education is the realization that each area has specific requirements which must be met. Further, these programs may vary with the specific training needs of each community. Since the building and other facilities are basically educational tools, they are essential to the educational process and will help to achieve the purposes of the program. Building design is, then, an expression of how the problems and ideas of educational program planning can be solved.

The very nature of technical education is especially unique in that building usage changes and requires certain characteristics to accommodate the needs of future technological developments. Hence, certain terms used in general design considerations need to be identified.

1. Flexibility: Construction of a building which can be readily adapted to learning requirements, enrollments and methods of teaching. This term is applied usually to the ability to change the interior building floor plan within a few minutes or a few hours without major structural change.

2. Convertibility: Is thought of as the ability to change the interior floor plan of a building to meet changing conditions in a month, a semester, or a year.

3. Expansibility: Usually requires the adding on to a facility the new requisites for floor space, utilities on the same level or by addition of another story as additional programs emerge.

A structure may be flexible or convertible in nature through the application of:

The Module
Moveable Walls
Non-bearing Partitions (cinder block or dry wall)
Under Floor Duct Work
Overhead Buss Bars
Floor Channels
Utility Corridors
Dropped Ceiling Space
Integrated Ceilings
Computer Flooring
Centralized Storage
Centralized Faculty and Administration Offices

4. Environment: Optimum control and balance of acoustics, heating, ventilating, humidity, lighting and color are all factors conducive to the learning process.

5. Aesthetics: Imagination and creativity to meet emotional as well as physical needs.

6. Safety: Involves adherence to overall structural safety, traffic control, proper lighting, space for each item of equipment, removal of exhaust fumes, and meeting local fire regulations.

7. Area and space relationships: The proper relationship of each area to others to facilitate traffic flow, reduce noise and confusion, and to compliment programs of similar disciplines requires optimum attention. Ease of movement of supplies and equipment should not be overlooked.

## Detail Requirements

A statement of philosophy and objectives of each subject area or discipline, requiring space and facilities in a new structure or one to be renovated, needs to be stated. The architect needs to know the nature of the activities and the teaching methods employed in each area before he can proceed with the design solution. He needs to understand that a laboratory should be thought of as a place for testing, experimenting, consulting and evaluating .... in other words, the laboratory shall be thought of as a place of thinking as well as doing and learning.

Space requirements, numbers, size, and kinds of rooms needed must be identified as well as the types and number of teaching stattions. This information can well be gathered on a form (See Form I) developed by the administrator responsible for technical education and articulated with his staff. From such a form, both the architect and the engineer can gather the necessary data to develop the preliminary and final plans and specifications for the proposed building.

Floor layouts or schematics relative to the placement of equipment and furniture and traffic patterns should supplement each form for each learning space, as well as auxiliary spaces such as storage, mechanical rooms and offices.

Data on each piece of equipment and furniture is required in order that the engineer may adequately meet the utility requirements for each machine. This data may be gathered by the engineer from a form (See Form II) describing complete specifications.

## General Considerations

It is necessary to enumerate facility and laboratory requirements that should be given careful consideration in planning educational specifications.

Areas Represented. Any basic industry or technology reflecting business, industry or a profession should be considered as a suitable and desirable basis for learning activities in a laboratory. These activities should involve studying, investigating, testing, and demonstrating and reflect the many facets of a technical discipline to be offered.

Resource Center or Library. It should be considered as much a part of the laboratory as any tool, machine, or area, and should be provided for and utilized in much the same manner.

Staff Offices. The staff should have offices or a designated area which includes a desk, typewriter, filing cabinets, etc., preferably located away from noise and dirt, but convenient to the reference and planning center.

Receiving and Storage. This should be provided as a service to all laboratories.

Local Limitations. Insufficient space or funds should be met by reducing the number of accommodations in several or all areas rather than by eliminating a complete area. It may be necessary to phase facility needs over a period of several years.

Nature of Equipment. The maturity of the students who are to use the laboratory should be a guiding factor in the planning and selecting of equipment, particularly as regards size, weight, power capacity, safety, and must reflect the technology being taught and found in local industries of the community.

Safety Factors. These shall be given first consideration in all laboratory planning. They become paramount in the placeing of equipment. Any area should be visible from every portion of the laboratory. Such points also include: the location of service facilities, and location of aisles of travel, and such items as light, color, and acoustical treatment. Machines or equipment around which exist zones of danger should be so placed as to reduce -- or eliminate -- the possibility of pupils being in line of danger. Such zones should be indicated on the floor by painted lines.

Handling of Hot Metal. In metallurgical laboratories the operation of hazardous machines and equipment such as the heat treating furnaces, cyanide pots, etc., should be isolated from all traffic and distracting interference as far as possible. Provision should also be made for adequate ventilation.

Interference. Pupil work stations should be placed to avoid interference from adjacent workers and aisle travel reduced to minimum.

Flexibility. Changing programs and pupil needs should be provided in any laboratory plan and installation. This implies that unassigned floor areas may occur, that large equipment should never be so integral with the building that it cannot be shifted, and that an abundance of well-distributed service tuility outlets should be provided in keeping with the desirability of semi-portable equipment. Expansion and alterations should be anticipated as a means of meeting further demands on floor space by new equipment, larger enrollments, character of the technology, etc.

## Laboratory Size and Shape

Size of the Laboratory. Determine by the general rule of allowing a minimum floor area of 125 square feet per pupil. This figure includes such auxiliary spaces as: storage space, dark room, planning room, etc., and is useful for laboratories planned to accommodate approximately eighteen to twenty students. Laboratories designed for operation by a single teacher should, for administrative reasons, not exceed 4,000 square feet in floor space.

Shape of the Laboratory. It should be rectangular and have a proportion of 1 to 1-1/2 or 1 to 2. The width should be approximately 40 feet; preferably more. Irregularly shaped laboratories such a "U", "L", etc., must be avoided as quite unsuited to school needs.

A Pupil Station is defined as any location in the laboratory where a student may be engaged, such as at a laboratory bench, a machine, a planning table, or a study carrel.

## Laboratory Arrangement

Aisles of Travel. These should be provided between all areas and points of common usage such as storage rooms, laboratory bench area and common machine areas. It is desirable to distinguish these aisles by lines painted on the floor. Areas should be so placed in relation to one another that a maximum working relationship exists.

For example, for a graphic arts laboratory, the photographic area, platemaking and composition should be placed in close proximity to one another.

Cleaning Space. Equipment occupying floor space should always be placed to allow for ease of cleaning around the base.

Tool and Supply Centers. These should be as centrally located as possible to reduce traffic and interference to a minimum. Tool or supply areas located in the center of the laboratory are probably ideal in this respect if they do not obstruct vision. Long narrow rooms are not adapted to the central location of a tool area. The best thing to do in these cases is to place it against the wall in the middle of the long side. Laboratories more nearly square in shape may develop a tool area only counter-high without upper screening as an excellent solution. Certain large pieces of equipment such as attachments peculiar to some one machine might well be placed adjacent to the machine on a small panel. This practice reduces traffic and demands at the tool or supply center which will make for less confusion and better laboratory administration. Certain small tools and equipment peculiar to a single area may well be stored and distributed in kit form to reduce tool center service to a minimum and speed up handling. This treatment is particularly adaptable to: mechanical, instrumentation and electronics technology.

Sequence of operations. Certain machines should be arranged with reference to sequence of operations and their relationship to other areas. Further attention should be given in placement of machines to assure adequate clearance for the work to be done.

## Auxiliary Facilities

Storage and Supplies. Storage for all areas may well be concentrated in a single storage room for ease of administration and control. No space, shelving, flat surfaces, etc. should ever be provided for storage unless some specific article or material is assigned to it. A place for nothing in particular is a place for everything in general. Anything belonging in the laboratory should have an assigned place.

Staging Area. Learning activities involving assembly of projects, experimental mock-ups, model building and simulation may require a space within a laboratory or in close proximity. Consideration for such space should be given to technologies related to building construction, instrumentation and civil engineering.

Rough Trimming. A power hack saw, paper cutter, hand saw, tin snips, or squaring shears, and other equipment used to prepare stock to size might well be located permanently in a receiving or storage center. Such practice avoids the unnecessary hazard of handling large and awkward sizes of stock in the work areas of the laboratory and eliminates the problem of returning unused stock.

Racks and Shelving. These should be provided for the orderly storage of all materials including lumber, sheet metal, steel, paper, hardware, etc. Project storage, on the other hand, may be provided elsewhere to care for partially completed and finished pieces. Such storage space should be designed to protect projects stored.

## Architectural and Service Considerations

An Outside Entrance near a loading ramp or platform should be provided large enough to admit an automobile or truck. The area at this door opening may well be utilized as a fabricating or assembly area for the sake of space conservation.

Exhibits. Lighted exhibit and display cases are highly desirable and may occur both in the laboratory itself and in central locations, main corridors, or in the principal part of the building.

Bulletin and Chalkboards. These are essential to the laboratory. One or more general bulletin boards should be placed in central positions such as the entrance to the laboratory. In addition to general bulletin boards, it is considered desirable to have a small board mounted near or in each work area. Posts and small wall sections may well be utilized in this manner. Wall space for permanent displays and a daylight projection screen should be provided. Chalkboard space in several or all areas is considered advantageous. Extensive chalkboard as well as bulletin board space near the resource area is quite essential.

Utilities. Gas, water, electricity and compressed air, vacuum and steam should be thought of as essential utilities for technical laboratories. A general distribution of outlets, particularly electrical, should be provided either with overhead buss bars or under floor ducts.

Washing. A sufficient number of washing facilities should be provided in or adjacent to a laboratory.

Toilet facilities. State and local code regulations usually determine the need for these facilities as well as drinking fountain requirements.

Natural Light is desirable and advantageous, though not dependable (See Artificial Light.) Precision equipment such as machine lathes, milling machines, drill presses, printing presses, laboratory tables, grinders, drawing tables, etc., should be given preference in location with reference to natural light. Natural light is best controlled by means of venetian blinds of light color and flat finish. The direction of the light source much be given careful attention in the placement of all equipment. Working positions directly facing windows are not satisfactory, with the possible exception of laboratory bench work. Even this practice may be objectionable along East, South, and West elevations.

Artificial Light should supplement natural lighting to the extent that the artificial light alone will provide illumination that conforms with good lighting practice. Good general lighting shall be provided up to an intensity of 125 foot candles at bench height in all areas and this should be supplemented with additional local lighting up to 200 foot candles, as required, on machines and in areas where precision work is done. In no case should a bare bulb ever be visible.

Paint for walls, ceiling and equipment should be semi-gloss of a good reflective and diffusing value selected in harmonious and pleasing colors artistically treated in a simple manner. Glossy surfaces on benches, machines, walls, etc. are to be avoided because of the glare they produce.

Power and Light Controls should be centralized on a control panel conveniently located in the laboratory. The nature of the laboratory may determine a need for auxiliary safety controls in other areas of the laboratory.

The Ventilation System. A circulating washed air system for the laboratory is most desirable from the point of view of health and maintenance. All excessive heat and fumes should be cared for by ventilating the areas involved by means of hoods and exhaust systems. Flues should be provided through which all gases may be carried to the outside. Separate flues for the finishing areas, chemistry laboratories, and heating units are necessary.

Dust and Refuse Collecting Systems. These should be piped below the floor.

Heating. These units should be placed to avoid occupying useful space and interference with operations. This suggests the considerations of recessed units or units suspended from the walls or ceiling or built within the air-conditioning system.

Acoustical Treatment. This is a necessity. Both walls and ceilings should be so treated. A minimum treatment would at least provide for ceiling absorption of not less than 60 per cent. Maximum absorption possible is deemed desirable especially if a ceiling treatment alone is used. (See also below.)

Floor Materials. These should be suirable to the area in which they are used. Wooden floors, probably maple or paraffin impregnated blocks-on-end, vinyl, asbestos or rubber tile is deemed most suitable. Terrazo, quarry tile or concrete should be considered for all metallurgical areas dealing with hot metals;

namely foundry, forging, and welding or where large quantities of water are used as in Civil Engineering. Rubber mat floor covering or abrasive anti-slip strips should be used as a safety precaution where machine operators stand. This is particularly important on smooth and slippery floors.

Walls, from the floor up to a dado or point of five feet, shuld be surfaced with some durable material easily cleaned and of a pleasing texture and color. Mat glazed brick, tile, formica, micarda, enameled 1/8-inch presswood, asbestos, tile, or vitralite is satisfactory. Above this point walls should be plastered or treated with a sound-absorbing material.

Ceilings should be not less than twelve feet in height, and all laboratories should be ceiled with a material of a high coefficient of absorption -- not less than 75 per cent.

Partitions, preferably of glass and steel, are desirable and essential for certain areas in the laboratory. Ideally, the maximum integration probably takes place where no partitions in pactice should preserve as far as possible the units of the laboratory by maintaining maximum visibility between the areas. This implies a 42-inch steel partition, the remainder being glazed to the ciling. For optimum flexibility where funds are available, movable partitions should be considered.

The time spent by the faculty, the director of campus planning, and the technical education administrators on good educational specifications will save time, money and disappointments later. The relationship with the architect and engineer will be much more congenial and efficient. You are more likely to end up with plans and specifications which will require a minimum of change orders and extras during construction. Such projects usually take twelve to eighteen months in planning and approximately the same amount of time for construction. The educational specifications are an important reference source. No major construction project should be undertaken without them.

## FORM I

## PRELIMINARY EDUCATIONAL SPECIFICATIONS
## FOR TECHNICAL FACILITIES

**Area of Instruction or Utilization** ____________________

**No. of Teaching Stations or Seats** __________ **Room Size** __________

**Type of Teaching Stations** ____________________

**Type of Furniture and Equipment** ____________________

**Type of Learning Activities** ____________________

**Auxiliary Rooms:** **Related Classroom** __________ **Demonstration** __________

**Planning** __________ **Conference** __________

**Faculty Offices** __________ **Tool Room** __________

**Storage** __________ **Other** __________

**Location: (as to related areas)** ____________________

____________________

**Ground Floor** __________ **Second Floor** __________.

**Floor (type)** __________ **Walls** __________ **Lighting** __________

**Safety Requirements** ____________________

____________________

**Water Service** __________ **Air** __________ **Gas** __________

**Fire Protection** ____________________

**Audio-Visual Facilities** ____________________

**Electrical Power:** **Wall Outlets** __________ **Floor Outlets** __________

**Voltage** __________ **KVA Total Amp. Load** __________

**Chalkboards** __________ **Lin. Ft.; Bulletin Boards** __________ **Lin. Ft.**

**Storage Closets** __________ **Lockers** __________ **Book Shelves** __________

**Type of Material to be Stored** ____________________

**Telephone Service** ____________________

**Walls (material)** __________ **Color** __________ **Windows** __________

**NOTES: (Use reverse side of sheet)**

## FORM II
## EQUIPMENT SELECTION

Department________________________Date__________

1. Item________________________________

2. Model No.________________________________

3. Number Units__________Cost per Unit $__________ Total $__________

4. Recommended Vendor________________________________

Address________________________________

5. Catalogue and No.________________________Page__________

6. Specification:________________________________

________________________________

________________________________

________________________________

7. Utility Requirements:
Electrical:__________HP__________PHASE__________CYCLE
Plumbing:__________Gas:__________
Air:__________Other:__________

8. Accessories:________________________________

________________________________

________________________________

________________________________

Accessories Cost $__________ Total Cost $__________

9. Courses in which equipment will serve:________________________________

________________________________

10. Anticipated Enrollment:__________ Utilization:__________ Av. Hrs. Per Week

11. Location: Laboratory__________Building__________ Room__________

12. Industries in which Equipment Reflects:________________________________

________________________________

________________________________

13. Staff Involved in Selection: 1.________________________________

2.________________________ 3.________________________

14. Advisory Committee (Chairman)________________________________

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## SURPLUS FEDERAL EQUIPMENT

Dr. George C. Decker
Surplus Property Utilization Officer,
U. S. Office of Education, Field Services

It is very good to be with you this evening and to have a talk with those of you that I've been acquainted with for many years. . . .

Within the last ten years particularly, the Office of Education in the Department of Health, Education, and Welfare has gone from a budget of three to four million dollars to a current budget of approximately four billion dollars. Now, that is a lot of money and it has come about through many pieces of legislation and continuing amendments to this legislation. We have over a hundred programs which we finance in whole or in part. Now, to run this down requires quite a but of understanding of how they may evolve. I am sure you will all have an opportunity to see American Education, a magazine put out by our Office of Education which runs a supplement, usually a double page supplement, which says where the money is used. . . .

The distribution of that four billion dollars in educational programs effects all types of programs, not just elementary and secondary. Many of them can be tacked together including secondary education and higher education. Those of us who have taught and who are in the business of preparing teachers can work together in terms of the preparation of teachers and the actual teaching and development of knowledges and skills among our youngsters. When you look at the chart that comes out each year in the American Education magazine, published by the Office of Education, you will find the programs listed, the amount of funds evolved, how they go from the Federal government through the states to the local institutions and in some instances, how they are made available directly to institutions and the departments within institutions or combinations of state and local units of government. . . .

I work for the Office of Education. My job is to know programs in the educational field and the funding that is behind them and how we may put these together. This is not in the handouts that you have but will be in the supplement of American Education which will come out later this year. The reason I am interested in what the Department of Health, Education, and Welfare is doing under a separate office, the Office of Surplus Property Utilization, is because it puts out through this program many hundreds of millions of dollars per year of personal property and real property. That is the land you walk on plus the buildings that may be there, plus installed equipment or inplace equipment and also the personal property, which can be moved as necessary or if wanted. We want the tax dollar to go as far as possible and to do as much as we can make it do under the circumstances. . . .

Of the four or five hundred million dollars a year of Federal surplus property which became available, 85 per cent goes to vocational and technical education. . . . This is all well and good but still not good enough because we find that the Federal government releases anywhere from a billion and a half to three billion dollars worth of Federal excess and surplus property every year. . . .

About one community college every two weeks is being completed in this country. New four-year universitites are being completed at the rate of several dozen a year so our educational means are continuing to grow. . . .

Now, we have funds for equipment for some of this new construction. I know all of you are familiar with this in terms of technical and vocational education in the thirteenth and fourteenth year, because you can get funds not only for construction but also for equipping these buildings. This year, the funds for equipment in the technical institutions of the thirteenth and fourteenth year are sadly "shot" if not entirely gone. For one reason or another Congress seems to have economized. I hope there will be a change before the final appropriation bill comes up. But I want to emphasize that those of you who are in need of new equipment or supplementing equipment this year particularly, will wish to watch these resources that come from the Federal government in terms of surplus property. As you may know if you have been following this for the last several years, we have been running a little short and the quality probably hasn't been as good as we would like to see in the surplus property field. There have been changes. First of all, a lot of junk that was in the surplus property field was shipped to Viet Nam and to Southeast Asia. . . .

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Today, we are faced with larger amounts of Federal surplus property which may become available to use in succeeding months and years than we have ever known in any one period. I would like to see those of you who are in this business of planning facilities and equipment and materials for a new program to submit your list for your programs. . . .

I think I have been in practically all state departments. We have within the last ten years put one or more persons in each state department of education to help on Federal programs so that the state people will understand what Federal funds are available for programs. . . .

Be sure to ask your state agency director of surplus property utilization about the most accurate way of listing the most needed equipment, by categories. Give him an idea about when you will need this information so that he can start looking. He can look not only within his state but throughout his region. We have in each region an Office of Education representative for people in vocational and technical education. . . .

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I would also add to this list the business of cooperation. Much that is released in Federal property in the United States is worth millions of dollars. No one school can handle some of the larger projects. We have data processing systems that are worth anywhere from a million and a half to three and a half million dollars. . . .

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At this particular time I am returning from overseas, equipment and materials in shipload lots that have been declared excess by the needs of the Department of Defense. Only seventeen states are participating in this program. A state must decide whether it wants to be a party to this or not. They must work through their association of state agencies and with the Office of Surplus Property. HEW sets up a cooperative arrangement for states wishing to become a part of this new system of procuring equipment. . . .

Since the operation of this return of property from Germany, there has been a strong feeling in Congress and in our agencies in the Federal government that it should be extended to Southeast Asia. This is under study now and is very likely to become a fact within the next few months. . . .

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# PLANNING AUXILIARY AREAS FOR VOCATIONAL AND TECHNICAL EDUCATION FACILITIES

Dr. Richard F. Meckley
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West Virginia University

A vocational school building is an aggregate of spaces designed according to function. The schemes for categorizing various spaces which make up an entire educational facility vary with the textbooks one reads. I suppose that one scheme is as good as another as long as it is inclusinve and provides a systematic way of planning for school construction. Wallace Strevell (8) categorizes school-plant spaces into the categories of general service (e.g. storage rooms, cooridors, etc.), assemblage (auditorium, gymnasium, etc.), and classrooms (both multipurpose and special). Another scheme of classification (6) is the one utilized by the Council of Educational Facility Planners (formerly The National Council on School house Construction).

The authors of the NCSC Guide for Planning School Plants subdivide building spaces into the categories of -

*INSTRUCTIONAL

*AUXILIARY TO INSTRUCTION

*NON-INSTRUCTIONAL

By using subject headings in three chapters of the NCSC publication devoted to the topics above, I composed an outline (figure 1) of the spaces which are normally included in educational facilities. In planning vocational facilities, the outline can serve as a convenient checklist to planners to assure that no space is overlooked.

Whether or not all of these spaces are to be found in a particular vocational school depends upon the nature of the educational program to be housed. Many of the spaces in Figure 1, particularly the "non-instructional" ones, are essential to any educational facility.

But vocational schools as they exist and as they are provided for in the 1968 Amendments to the Vocational Education Act are of many sizes, shapes, and varieties. (7) According to the 1968 amendments an "area vocational school" is:

1. A specialized high school
2. The department of a high school
3. The department or division of a higher education institution.

Figure 1

## EDUCATIONAL FACILITY SPACES

Instructional

I General Purpose (interchangeable classrooms)
  a. elementary
  b. secondary school
  c. college and university

II Special Purpose Instructional Spaces
  a. art rooms
  b. business ed. rooms
  c. D. E. rooms
  d. exceptional child
  e. home and family life
  f. kindergarten
  g. language lab
  h. music
  i. inst. rooms
  j. practice rooms
  k. office
  l. regular classrooms
  m. music library
  n. storage

III Physical and Health Education Facilities
  a. gymnasium
  b. gym-auditorium
  c. swimming pool

Auxiliary to Instruction

I Auditorium

II The Commons

III Food Service Facilities

IV School Supply and Equipment Storage

V Office Space and Central
  a. principal's office
  b. storage
  c. valult
  d. teachers' rooms
  e. clinic and health guidance suite

VI Instructional Material Center

Non-Instructional

I General Public Use Facilities
  a. corridors, halls, lobbies, vestibules, ramps
  b. stairways
  c. toilet rooms
  d. clothing supply storage
  e. elevators

II Site Service Facilities
  a. toilets
  b. equipment storage
  c. building service storage
  d. parking facilities

III Building Service Facilities
  a. central service building
  b. de-dentralized building service areas

    1. locker and lounge area
    2. building service office
    3. records and shipping room
    4. custodial service closets
    5. waste paper disposal
    6. building service elevator
    7. laundry
    8. storage room for supplies and equipment
    9. outdoor storage and service rooms
    10. workshop

Figure 1, Continued

| Instructional | Auxiliary to Instruction | Non-Instructional |
|---|---|---|
| III Physical and Health Education Facilities<br>a. gymnasium<br>b. gym-auditorium<br>c. swimming pool | | IV Utility and Other Mechanical Systems<br>a. boiler (heater rooms)<br>b. sanitary facilities<br>c. water supply<br>d. sewage disposal<br>e. electric services<br>f. telephones<br>g. program clock<br>h. alarm systems<br>i. exterior lighting<br>j. vacuum cleaning equipment |
| IV Science Facilities<br>a. Junior High<br>b. multi-purpose Senior High | | |
| V Industrial Arts, Vocational Shops and Labs<br>a. industrial<br>b. agriculture | | |

The kind of school being planned will greatly determine the extent of the need for planning auxiliary spaces by vocational educators. In many cases, in planning a so-called comprehensive school, vocational educators are only called upon to assist with the planning of vocational shops, laboratories, and the like. The fact that vocational students will utilize the same auxiliary spaces as general education students would indicate that vocational educators should be instrumental in planning the entire educational facility.

## Planning Auxiliary Facilities

Educators are often charged with using vague and ambiguous terminology. Such terms as the "whole child" and "full potential" take on as many definitions as there are educational philosophers. Thanks to Mager and others, educators are starting to move away from this poor and fruitless habit.

So, I will attempt to define the term "auxiliary facility" as operationally as I can. Thusly,

An auxiliary facility is a space used to aid instruction, but one in which only limited or no formal instruction takes place. Specifically, the spaces to be considered in this paper are:

1. The Auditorium
2. Informal Student Assembly Areas
3. Instructional Materials Center
4. Office Space
5. Supply and Equipment Storage

This then delimits my discussion to the auxiliary spaces above. I will not be considering such non-instructional spaces as corridors and boiler rooms. Although important, they do not fit my arbitrarily imposed definition of auxiliary facilities.

## Planning the Auditorium

Basic questions a planner should ask himself in planning the school auditorium include:

1. What activities, both instructional and non-instructional, are planned for the auditorium?
2. What student seating capacity will be required for each of the planned activities?

3. What are the environmental requirements for each of the planned activities?

4. What should the auditorium location be with respect to other spaces both inside and outside the building?

Activities - The usual function of the auditorium is to serve as a space for student assembly for one purpose or another. However, student assembly for one purpose or another is not a very frequent activity in most vocational (or academic) schools. If an occasional student assembly is the only anticipated activity, the high expense of constructing an auditorium is hardly justified. For example, if the auditorium were only used one hour of a thirty hour week, this would mean that while school was in session the auditorium would be unused over 60 per cent of the time.

Sometimes to alleviate this problem and promote economy, combinations such as an auditorium/gymnasium/cafeteria are provided. Experience has shown that the more unlike are the activities planned for the same space, the less is the likelihood that it will accommodate any of the activities adequately. Construction money saved by multiple use of the same space often fails to offset the fact that the space does not really serve any of its designated purposes.

Perhaps a better solution to the low utilization problem is to plan instructional and community activities to be accommodated in an auditorium-like space. John Herrick gives three catagories of needs to be considered in auditorium planning, namely "the needs to the instructional program, the needs to the social life of the school, and the needs of the community" (3). The most important of the needs, according to Herrick, is the instructional program. Thus, well-designed space can be used for:

1. Student assembly for the purpose of listening to and viewing various kinds of presentations;

2. Community activities such as concerts and plays; and

3. Large-group student instruction.

Capacity. The seating capacity for the auditorium is determined, in general, by the activity which will involve the greatest number of persons at one time. In most cases, the activity should be an instructional one that occurs frequently rather than, say, an annual non-instructional event such as commencement.

To illustrate, suppose a vocational school is being planned for a maximum student enrollment of 1,000. If all students are to be assembled simultaneouly, an auditorium with a seating capacity of 1,000 is called for. Suppose further, however, that it has been determined through educational planning that large-group classes for up to 250 students will be utilized. Rather than build a 1,000-seat auditorium which will rarely be filled to capacity, it might be better to construction a facility which can be used occasionally for student assembly by seating a certain fraction of the entire student body spaced over several time periods.

Environmental requirements. Planned activities also determine environmental requirements for the auditorium. In this paper, the work environment is used in a general sense to include such things as furniture and equipment; aesthetic, aerial, visual sonic, and safety requirements; vertical instructional surfaces; and utility needs. All of these factors must be considered and mixed in the right proportions to assure a functional auditorium.

If the auditorium space is also used as a gymnasium and/or cafeteria, then, of course, fixed seating is nearly out of the question. HOwever, if it is not a multi-use space, fixed, tiered seating seems desirable. The number of seats to be installed depends upon decisions made concerning desired capacity as discussed above. Whether or not seats are equipped with tablet arms is related to the extent the auditorium will be used for instructional purposes.

There are other alternatives to be considered in selection of furniture and equipment for the auditorium. They include:

1. Should the stage be a permanent or a portable type which can be easily stored?

2. Is the auditorium of sufficient size that sound amplification will be needed?

3. Will controls be needed for controlling light intensity?

4. Will a permanent or portable lectern be required?

5. Should the projection secreen(s) be permanent or portable?

6. What provision should be made for storage of auditorium equipment?

7. Will the auditorium receive sufficient yearly use to justify the installation of zoned heating and air conditioning?

8. Should provision be made to subdivide auditorium space into smaller instructional spaces through the use of movable partitions?

Location. A ground floor location with easy access from outside is most desirable, if not mandatory. This allows ease of access by community groups without the necessity of moving through other parts of the building. Delivery of various kinds of supplies and materials is also facilitated by such a location. Also convenient and adequate parking space should be nearby.

The location of the auditorium within the building will vary with its intended functions. If it is to be used principally for large-group instruction, its location should be somewhat central to instructional spaces such as regular classrooms, seminar rooms and vocational laboratories. If however, its intended use is for such things as occasional student assemblies, band practice, and community meetings, it is probably best located away from areas requiring a minimal noise level, e.g. the academic and related classrooms and the instructional materials center. In many campus-type educational facilities, the auditorium is a separate, centrally located building.

## Planning Informal Student Assembly Areas

Informal student assembly areas are speaces within or outsidde an educational facility where students can assemble for such unstructered activities as "bull" sessions, light reading, and just plain relaxing. Whether or not such areas are to be provided depends upon the extent to which students will have time to use them. A "tight" schedule which requires the student to be in either a laboratory or related instructional area during the school day would not allow time for students to get together.

An outside informal assembly area is only practical where the climate is favorable. It is not uncommon, however, for schools in northern climates which are not open during warm weather months to have an outside court surrounded by the building on all sides. From a student-use point of view, this space could be better used for other pruposes. I suppose, though, it might be rationalized for aesthetic reasons.

The equipment and furnishings of an inside informal student assembly area, of course, depends upon planned activities. Technical institutes, junior colleges and the like may require a student union with reading rooms, lounges, snack bars, etc. It is my personal bias that if the construction budget is tight, informal student assembly areas can be provided at a later date or on a limited scale.

## Instructional Materials Center

The instructional materials center is the current accepted euphemism for a well-equipped library. The IMC houses other instructional materials in addition to books and provides spaces where students can engage in other activities in addition to reading books.

An instructional materials center is an essential part of a modern vocational school. Vocational instruction is becoming more varied and complex. The services and facilities of a functional IMC can assist greatly in the teaching-learning process. The IMC should not be considered a replacement for subject area libraries. Individual libraries containing often used reference materials are still needed for use at the sources of instruction. The metallurgy student should not have to travel all the way to the IMC to find the coefficient of linear expansion for copper.

The same four basic planning questions used in planning the auditorium can be utilized in planning the instructional materials center. These questions related to: 1) activities to be housed; 2) student capacity; 3) environmental requirements; and 4) location.

Activities. Student activities which may take place in varying degrees in the IMC invlude reading, viewing slides, films, etc., browsing, studying, listening to tapes, records, etc., and small-group meetings. The extent to which any of these activities will occur in the IMC is a function of the total educational palnning by the various departments of the vocational school.

Student Capacity. To compute the student capacity required for the various discrete areas of the IMC, each vocational department must estimate the approximate time its students will need to avail themselves of each of the services to be provided. A summation of all student-use time by all departments will yield an approximation of the required student capacity. To this required capacity must be added additional capacity for such non-required activities as browsing and personal reading. Sometimes IMC student capacity is calculated by merely multiplying total maximum student enrollment by a figure such as 10 per cent.

Environmental Requirements. If the IMC is to be principally a library, the spaces to be planned would include student reading areas, shelf space, a book check-out area; and workroom. However, if any or all of the student activities mentioned above are to occur, study carrels, seminar, viewing, listening rooms and the like are necessary. Special attention should be given to accoustical and lighting requirements of the individual spaces making up the instructional materials center.

Location. The IMC is the heart of any school and should be so located. A central, ground floor location to allow ease of access of people and materials seems essential. If not a ground floor location, elevator service will be needed to move materials, books, and equipment to and from the facility.

## Planning Supply and Equipment Storage Areas

The following storage areas are required for any vocational school:

*Shipping/receiving room. A fairly large shipping and receiving room immediately accessible from the school service drive is needed to ship, receive, and temporarily store the many supply and equipment items which come to and leave a vocational school. The shipping/receiving room should b equipped with at least two sets of double doors: one set leading to a loading dock adjacent to the service drive; one set leading to the building corridors. Fixed or movable storage shelves are desirable. Also carts of various kinds for moving supplies and equipment should be available.

*Central storage room. The central storage area might be part of the shipping/receiving room. However, if the material is to be stored on a semi-permanent or rotating basis (e.g. textbooks, office supplies, etc.) a separate facility is indicated. This room should be equipped with permanent shelving with sufficient space between for movement of persons and carts loaded with supplies and equipment. Double doors with access to the building corridor is a necessity. If the central storage room is adjacent to the shipping/receiving room, double door accessibility is most desirable.

*Laboratory storage. It is difficult to generalize about laboratory storage needs. The storage needs for an electronics laboratory are quite different from those of the auto body shop. It is my bias that storage in laboratories should be only for items frequently used for instruction. Other less frequently used items can be placed in central storage and transported to the laboratory when needed. This plan will help reduce the messy, cluttered, disorganized appearance which is unfortunately characteristic of so many vocational shops and laboratories.

*Classroom storage. For some reason, regular classrooms and seminar rooms rarely seem to have adequate storage facilities. Among the many classroom items which need to be sotred are reference materials, overhead projectors, tape recorders, and demonstration equipment. It seems better to have these items readily available in the classroom rather than having to lug them from other building areas.

It seems axiomatic that there is never enough storage space. Judging from some of the stuff stored at various vocational schools which I have visited, vocational educators should give consideration to what items might be thrown away in preference to providing valuable storage space for them.

## Planning Office Spaces

Office space should be available to all administrative, supervisory, and instructional personnel. Private offices from 120 to 250 square feet, each, cnetrally located are required for central administrative personnel such as the superintendent, assistant superintendent, and vocational director. In technical colleges, equivalent titles would be president, dean, technical director, etc. Other space normally included in the administrative suite are a combination general office and reception area, pupil personnel offices (guidance, placement, etc.), departmental offices (if centralized), health clinic, work room, and faculty lounge.

Departmental supervisors (i.e. home economics supervisor, trades and industry supervisors, etc.) may have their offices grouped in a central location adjacent to departmental instructional areas. The principal advantage of centrally locating supervisory offices is inter-departmental coordination and cooperation. On the other hand, de-centralized supervisory offices are convenient to instructional areas and instructional personnel.

Each instructor should have the convenience of office space for lesson preparation, student consultation and reading. It is not necessary that each instructor have an individual office; however, offices having two or three instructors with 60 to 70 square feet of space per person is usually adequate. This provides enough space for a one-pedestal desk and chair, 4-drawer file cabinet, and a bookcase for each instructor.

## Some Illustrations

The Center for Vocational and Technical Education, The Ohio State University, has very generously provided me with some facility layouts for vocational and technical schools. These layouts or floor-plans appeared as a section of a recent Center publication. All of them are found in the appendix of this paper--even though they illustrate both instructional and auxiliary spaces.

Auditorium. The auditorium shown on the floor plans for the Russelville, Alabama Vocational School is of conventional design. Its primary functions would be student assembly and community-school activities. Not shown in the layout, but perhaps provided, are stage storage areas and individual practice rooms. One assumes that the two adjacent shops are not sources of noises which would be distractive in the auditorium.

The auditorium seen in the layout for the Columbia, South Carolina Vocational Education Center is designed primarily for instructional purposes. It is centrally located, adjacent to the library, and reasonably accessible to instructional areas. However, the clustering of subject areas places the auditorium in a convenient location for some departments and inconvenient for others.

The cultural arts center (which is really auditorium-type space) is centrally located in the Shawsheen Regional Vocational School floor plan. The center has a TV control room where TV presentations can be set up in advance.

Although the floor plans are not shown, many junior colleges such as Western Piedmont College in North Carolina has a large-group instruction space which is equipped for lecturing, listening, and viewing. Visual aides (slides, movies, etc.) are flashed onto screens from a specially equipped room behind the screens. The instructor coordinates this multi-media approach with controls located at the lectern. It is an effective method for the instructor with the needed mental and physical dexterity.

### Informal Student Assembly Areas

The Clay County Vocational School, Manchester, Kentucky is designed with perimeter shops around a classroom core. Between the shops and the classroom core is seen a rather extensive corridor area equipped with benches for student seating.

Although Colorado Mountain Junior College is essentially an aggregate of hexagonal clusters, the design easily lends itself to provision of informal student assembly areas. An atrium or open yard is located at the building entrance. Another of the hexagonal spaces is set aside for a fairly large student union dining hall and lounge. Adjacent to the student union, a recreation area is projected for the future.

### Instructional Materials Center

The floor plans for the Shawsheen Valley Regional Vocational Technical High School, Burlington, Massachusetts show a well-equpped instructional materials center. Shelving is around the room periphery with most of the floor space made up of area for independent student study, lounging, and charging out books and other instructional materials. An AV workroom and office for the librarian are directly accessible to the IMC. Also a conference room is conveniently located nearby. The central location of the IMC with respect to classrooms should also be noted.

### Storage

A design by Shannon and Morgan, Lexington, Kentucky of a 6-unit vocational facility allows ample storage areas. In addition to a central, general storage area is found individual storage areas for each vocational department.

### Office Spaces

Departmental offices are conveniently located throughout the Wahpeton, North Dakota State School of Science. Many of them can be entered from both corridor and shop areas.

The floor plans for the hexagonal-clustered Colorado Mountain College show a well-designed central administrative suite. Included are two private offices, a reception area, lounge and restroom area, and a business office. It is located at the building entrance making it convenient for school visitors.

## Conclusion

The illustrations show rather clearly that the same kind of auxiliary areas can be designed in radically different ways and still accommodate educational programs. The ultimate test for good planning of auxiliary facilities is vocational program adequacy. This means that before educational specifications are written, vocational educators must make the necessary and vital decisions on the school's philosophy of education, objectives, and the mechanics of the program to implement these objectives.

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# SIMULATION IN PLANNING VOCATIONAL-TECHNICAL SCHOOLS

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Simulation is gaining ever-increasing acceptance as an effective instructional method. It is being utilized successfully by the military, by the social sciences, by education, and other fields as a method for teaching important skills and concepts.

Simulation training is a form of learning by doing. Insofar as possible, participants are placed in realistic but controlled problem situations which require them to take immediate and spontaneous action. Action is a key word in simulation as the student is not given time to speculate and mull over possible problem-solutions. Right or wrong, rational or irrantional, he is required to respond to and make decisions on problems as they occur. Later he has the opportunity to discuss the appropriateness of his action with fellow students and instructors.

The principal value of simulation as an instructional technique is student involvement. In well-structured exercises, students virtually assume their simulated identities. Interaction, at times, can become quite emotional. During a field testing of center-developed simulation materials conducted with graduate vocational students, one student was assigned the role of Dr. Crawford. During a role-playing exercise, one of the other participants made the mistake of referring to him as Mr. Crawford. "That is Dr. Crawford," quickly interjected the first student in a somewhat indignant manner.

## Basic Types of Simulation Training

Two commonly used types of simulation training in the field of education are the "in-basket/out-basket" technique and role-playing. The Madison Simulation Materials developed by the University Council of Educational Administration is an example of "in-basket/out-basket" simulation. The Madison Simulation Materials are used in the training of elementary and secondary school principals. Each student participant assumes the role of principal in the hypothetical Madison, Lafayette school system. Based upon certain background information furnished to him, his own professional insight and intuition, and his nervous system, he responds to items of varying degrees of seriousness as they appear in his in-basket.

An example of role-playing simulation training is Special Problems: The Saint Stephen's Principalship which was developed by Glenn Immegart and others at the University of Rochester in cooperation with the Catholic Schools, Diocese of Rochester, New York. In the simulation package, a number of problem situations are devised in which students assume certain roles. For example, in one interaction exercise based on communication problems between lay and religious teachers, three students are assigned to play the roles of lay teacher #1, lay teacher #2, and Sister Monica, school principal. Prior to interaction, each of the role players is provided with a brief role-perspective. The interaction or role playing that follows, however, is completely unstructured.

## Simulation Training for Vocational and Technical Educators

To date, the Center for Vocational and Technical Education, The Ohio State University, has developed two simulation training programs for vocational educators. The first simulation package was developed by Dick Rice with some help from me and is entitled, Simulation Training Exercises for Vocational and Technical Education Supervisors. The package is made up of three "in-basket/out-basket" exercises and one role-playing exercise. The problems presented in the simulation training exercises are ones typically faced by state supervisors and do not relate specifically to any particular vocational service area. The first three exercises in this package are in the in-basket/out-basket type and the fourth exercise is role playing. In the first three exercises, each student assumes the role of Francis Ramey, Assistant State Supervisor, Division of Vocational and Technical Education, Lafayette State Department of Education. As Francis Ramey, he is required to take action on various problems frequently encountered by state supervisors. Some of the in-basket items are routine in nature; others are more serious and require difficult decision-making by the simulator. In the role playing exercise each participant assumes a different role for a State Department staff meeting held for long-range and immediate vocational education planning for Big City Schools in the state of Lafayette.

The simulation training materials for state supervisors were field tested at a leadership development workshop held in Chicago, Illinois early in February, 1969. The workshop was under the co-sponsorship of the Center for Vocational and Technical Education and Region V, U. S. Office of Education. The participants consisted for the most part of relatively inexperienced assistant state supervisors in various fields of vocational education. There were also one or two experienced supervisors from each state who assisted the instructors with the various activities of the workshop.

The emphasis of the workshop was participation. Large-group presentations dealing with concepts of supervision, leadership, human relations, and decision-making as they related to the individual simulation exercises were brief, concise and spaced judiciously over the five-day period. The experienced state supervisors and teacher educators led small-group discussions on the merit of problem-solutions advanced by the inexperienced participants. Each small group appointed one person to serve on a reactor panel for reporting of the group's consensus on problem solutions when the large group reassembled. Reactions and evaluations or workshop participants (taken daily and totally at the end of the workshop) indicated that the format was instructionally sound.

## Simulation Training in Vocational and Technical Facility Planning

The project for developing a simulation training package for vocational and technical facility planning was an outgrowth of two previous Center projects. The projects which I discussed above was directed by Dick Rice and resulted in simulation materials for training vocational supervisors. The other project, which was completed about a year ago, resulted in the preparation of fifteen guides for planning vocational and technical education facilities. The format for these guides was developed cooperatively by Center project staff members and M. J. Conrad, Head, Administration and Facilities Unit of the College of Education, The Ohio State University. Fourteen guides were developed to provide specific help in the planning of facilities for different vocational and technical subject areas. The fourteen subject areas covered were home economics, machine trades, data processing, business and office occupations, laboratory animal science, electrical technology, automotive sciences, metallurgy, medical X-ray technology, medical assisting, medical-clerical work, dental technology, dental assisting, and dental hygienics. Two other guides were an outgrowth of the project: one general guide for planning occupational preparation facilities, and another publication entitled "A Guide for Systematic Planning of Vocational and Technical Educational Facilities". The latter guide offers an overview of the entire planning process from initial survey of needs to final building occupancy.

The insights gained in the simulation project were combined with those gained in the facility planning project in the development of simulation matterials for vocational and technical facility planning. The simulation training exercises focus on four activities particularly relevant to state supervisors of vocational education. Tehse four activities are: program planning, proposal review, site selection, and preliminary facility planning.

The simulation package used by the students consists of five sections. The first section, "Tri-County Background Materials," contains data and information on the study area. The study area is in the hypothetical state of Lafayette. Within the state of Lafayette, the three counties of Washington, Putnam, and Jackson have combined into a tri-county vocational school district and are planning to erect facilities. Data on the tri-county vocational school district includes topographical features and climate, demographic statistics, past and present population trends, economic factors, transportation arteries, political climate, occupational information, labor force characteristics, existing educational programs, and tri-county financial resources. The last four sections of the package are the exercises themselves. The first three are of the in-basket/out-basket variety in which each student assumes the identity of Francis Ramey, Assistant State Supervisor, Department of Facility Planning, Division of Vocational Education, Lafayette State Department of Education. In addition to a title, Francis Ramey is also given some educational experience which includes a BS Degree in Industrial Education from Lafayette State University and an MA Degree in Vocational Administration from Lafayette State University. His work experience has been three years as an apprentice machinist at the Madison Machine Tool Company, two years as a journeyman-machinist at the Madison Machine Tool Company, and five summers as part-time architectural draftsman for Harry Stone, Architects, Madison, Lafayette. Ramey's teaching and administrative experience before entering the State Department was three years as a teacher of machine shop and drafting at Madison High School and three years as local supervisor of vocational education in the Madison City School District.

The fourth and final simulation exercise in Vocational Facility Planning requires role-playing on the part of students. They meet together in small groups of five and each assumes a role to play in a preliminary facility planning meeting. The roles to be played are: 1) Mr. Frances Ramey, Assistant State Supervisor, Lafayette State Department of Education; 2) Mr. Mark Miller, Superintendent, Tri-County Vocational District; 3) Dr. Miles Crawford, Professor, School Planning Department, Lafayette State University; 4) Mr. Joseph Lombardi, Architect, Lombardi and Weber Architects; and 5) Mr. Edward Taylor, Vocational Supervisor, Madison City School District.

Each student is given background materials or role perspective for the role he will play. His material includes background information on the preliminary planning meeting, letters, memos, and a very brief role perspective and definition. To keep simulation as authentic as possible, each student is given only background material for the role he is playing.

Because the simulation exercises are for training purposes, some conflict has been built in to the role-playing exercise as well as the other three. Some of the role players are given conflicting expectations by two or more of the others. He thus is placed in a situation where he must take a position on the problems to be discussed at the meeting while, at the same time, he displays patience and tact in dealing with others. The human relations aspect of supervision is most important in the role-playing exercise.

Up to now, I have attempted to give a general overview of simulation training in planning vocational and technical education facilities as developed by the Center for Vocational and Technical Education. The problem with general descriptions is that they are often too general and leave many questions in the readers mind. To alleviate this situation I would like to offer a suggested instructional procedure and present a few illustrations from the simulation package which will give a better idea of its format and content.

## Instructional Procedures

The instructor's method of using the simulation training materials as indicated in the instructor's manual is largely his own prerogative. However, the authors of the material successfully used the procedure or instructional model below. The suggested procedure at the instructor's option can be used completely, used partially, modified or disregarded.

The suggested instructional approach used consists of four discrete and sequential phases:

I. IDENTIFICATION OF OBJECTIVES - In this initial phase, students are given the objectives set forth in the simulation training program. Suggested objectives for students are: 1) to acquire a better understanding of the role of state supervisor; 2) to be able to distinguish between leadership, management and regulation; 3) to see the need for both technical and human relations competency; 4) to realize the importance of rational decision-making; and 5) to see the need for and increasing the skills of communication. The instructor is free to add or to subtract objectives from those suggested above.

II. ORIENTATION - During this phase the student is introduced to the simulated setting, his professional position, his co-workers, the State of Lafayette, and other information relevant to the simulation exercises to follow. This information is available to both instructor and student in the simulation "data bank" supplied. In addition, the instructor is furnished with a set of overhead transparencies to aid instruction.

III. SIMULATION EXERCISES - Actual simulation occurs during this phase of instruction. The student assumes the role of Francis Ramey, Assistant State Supervisor, in the first three exercises. The fourth exercise is role playing in which each student assumes a different role. All four exercises follow the same pattern:

   a. Preliminary Instruction and Problem Background - All students (large group) are given necessary written instructions prior to each simulation exercise. The instructor also discusses the problem in a general way touching on various concepts of supervision, leadership, human relations, communications, etc. as they relate to the exercise.

b. Student Participation in Simulation Exercise - Students are subdivided into small groups (5-12 persons). Each student works individually on the simulation problem.

c. Student Discussion of Simulation Exercise - Still in small groups of 5 to 12 persons, students discuss the problems presented by the exercise and their individual solutions. The discussion is led (not dominated) by an experienced supervisor or teacher educator. One person is designated to act as recorder and later as report to the large group. Particularly effective, in the pilot program, was the use of experienced state supervisors as small group discussion leaders. The group leaders were prepared for their role in the simulation by means of a brief orientation prior to the training program. The following guidlines describe the role set for them. They were told to:

    1. Appoint a recorder for the group. Turn in such reports to the workshop director at the end of each day.

    2. Organize the group into a round-table seating arrangement.

    3. Lead group to recognize the objectives, concepts and skills which evolved from the presentation or activity being discussed.

    4. Accept the role as moderator and resource person:

        (a) encourage total group participation through an informal approach;

        (b) make every effort to keep the discussion centered on the topic at hand;

        (c) limit personal participation to management, clarification, and as a source of information.

    5. Have the group designate a person to serve on the reactor panel which will report to the large group after each small group discussion.

    6. Be sure the group convenes and dismisses according to schedule or announced time.

d. Reactor Panel - After small group discussions, the large group reconvenes. A reactor panel composed of one representative of each small group reports his group's reaction to the simulation exercise. An experienced supervisor or the instructor serves as moderator of the reactor panel.

IV. EVALUATION - After each simulation exercise, and after completing the entire simulation training programs, evaluations (both written and oral, and formal and informal) should be made by student participants. The purpose of these evaluations is to judge the efficacy of the simulation exercises as instructional materials, discover weak points in the materials and instructional techniques, and suggest ways to improve the simulation training exercise for future use.

## Simulation Exercises in Planning Vocational and Technical Education Facilities

Exercise I. This exercise deals with the planning of a program for an anticipated new vocational school for a tri-county area. In the exercise, each student assumes the role of Frances Ramey, Assistant State Supervisor, Department of Facility Planning.

The student is told who he is and the important people with whom he must interact in simulation exercise I. These persons include Mrs. Mary Martin, his secretary, Mr. Marion J. Hiller, his superior, Dr. James Brewer, superintendent of Madison City Schools, and Dr. Milford P. Conroy, state director of Vocational Education. A brief character sketch is given of each of these persons in order that the student will have some idea of the kinds of persons with whom he must interact.

As background material, the student is told that a few years ago he was a member of the state department task force which surveyed the vocational needs of the tri-county area of Washington, Putnam, and Jackson Counties in the State of Lafayette. During that period of time he worked with an ad hoc committee representing the three counties. He is informed the survey has been completed and a tentative list of course offerings has been developed. This list of curricular areas and course offerings are part of the introductory material given to the student.

As one example of the kinds of predicaments faced by Ramey in the simulation exercise, he is put in the difficult position of enforcing some unpopular regulations while at the same time trying to maintain reasonable harmonious relationships with officials of the Tri-County Vocational District. This is really not an uncommon situation for state supervisors. As he sits before the committee of tri-county school officials, he is asked to immediately take a position on a problem which on the surface, at least, seems insoluble. The student must respond to the problem immediately and has no time for prior study and consultation.

## Exercise Two

The second simulation exercise deals with the proposal submitted to the state department for the Tri-County Vocational School District. A complete proposal is presented for evaluation by the student which is included in the package. The student as Francis Ramey must attend a state board meeting in which the proposal is presented for approval. However, at the last moment, one of the larger districts makes a decision to pull out of the jointure. The state director becomes quite disturbed at the meeting and calls upon the student (Ramey) for a quick and retional explanation. The pull-out comes as a surprise to Ramey; nevertheless, he must respond immediately and make any recommendations he deems advisable.

## Exercise Three

Exercise three deals with the process of site selection for the proposed new vocational school. The student, still Francis Ramey, judges the adequacy of three sites for the school on the basis of criteria furnished to him. The exercise is somewhat frustrating since Ramey only gets to choose from three sites on which there seems to be insufficient information. One value of the exercise is detecting whether or not the student recognizes that he lacks sufficient information and data for rational decision-making.

## Exercise Four

Exercise four is a role-playing exercise requiring five participants. Each participant assumes one of the following roles:

1. Francis Ramey, Assistant State Supervisor
2. Mr. Mark Miller, Superintendent, Tri-County Vocational District
3. Dr. Miles Crawford, Professor, School Planning Department, Lafayette State University
4. Mr. Joseph Lombardi, Architect, Lombardi and Weber, Architects
5. Mr. Edward Taylor, Vocational Supervisor, Madison City Schools

As I mentioned previously, each participatn is furnished with background material and a perspective for the role he will be playing. The role relationships are structured in such a way that conflict is nearly inevitable.

## Concluding Word

It is my view that simulation is an effective instructional technique which can be used for pre- and in-service training of vocational educators. Simulation requires active participation by each student who is given a chance to apply learned concepts and principles to problem situations which occur daily in vocational/ technical administration and supervision. The student simulator not only learns the content and functions of his field of specialty; he also learns a lot about himself.

# THE PLANNING AND CONSTRUCTION OF GREEN RIVER COMMUNITY COLLEGE

Dr. Raymond J. Needham
Dean of Instruction
Green River Community College

In the planning and construction of Green River Community College many steps were taken to insure the development of a comprehensive community college serving students with academic, vocational, and continuing education. A community study during 1963 indicated a need to develop an educational program which placed equal emphasis on vocational-technical education and academic education, with emphasis on continuing education in both areas. The proposed student body make-up of the college was one of the first major decisions made prior to any decision concerning building construction.

The following chart indicates graphically the proposed Green River Community College enrollment:

| | Vocational-Technical | Academic Programs |
|---|---|---|
| Preparatory Program | Full-time prep Voc-Tech students<br>30 per cent | College transfer students<br>30 per cent |
| Continuing Education | Voc-Tech part-time, extension, upgrading programs, and apprenticeship programs<br>20 per cent | Basic education, community service, general interest, high school diploma, developmental skills.<br>20 per cent |

Fall quarter 1969 registration of approximately 5,000 students indicate that the above predicted percentages within the various programs are near the original planning estimate for the college in 1963.

Early planning and construction of green River Community College include the following steps:

## THE EDUCATIONAL OBJECTIVES

The Green River Community College Program is planned to satisfy the educational needs of its community by providing educational opportunity to:

1. The student who wishes to transfer to a four-year institution with full credit for work accomplished in the first two years at Green River Community College.
2. The student who intends only to take one or two years of college level work by attending either a day or evening program in general, technical or vocational education courses.
3. The student who wants to pursue courses not classified in either of the above but desires knowledge of a special subject not normally related to educational self-improvement of sufficient interest in the community to warrant the offering of such a subject.
4. All students, through a comprehensive program of general and special counseling by the staff, to help each student so that he may better utilize his education, career and life to benefit himself, as well as his fellow man.

These objectives were studied carefully in terms of what correlary subjects are to be offered in the neighboring community colleges of Tacoma and Highline. The program developed herein is outlined to avoid duplication of strong programs in those colleges. Offerings will attempt to complement and enlarge upon programs that will not be developed as fully at Tacoma and Highline. As the sponsoring communities of Green River Community College may determine, specific educational programs to satisfy local business and industrial needs will have to be continually developed to provide students with the best education of its type this institution can offer.

## THE ORGANIZATION OF THE CAMPUS

The Educational Criteria (in order of considered importance)

1. Design campus for a full-time enrollment of 2,500 F.T.E. students.

2. Library to be primary building on campus and be sustained as the center of interest.
   a. Locate convenient to student traffic.
   b. Open main entrance generally toward all other major buildings.
   c. Academic administration located with direct relation to library with access convenient to parking areas.

3. Student Center to be located so as to draw vocational and academic students together.

4. Avoid upper and lower campus concept.

5. Provide for change of function and/or expansion of academic, vocational, and science-technology programs, beyond normal expectations of flexibility.

6. All physical education facilities should be located together, near public parking.
   a. Provide two baseball fields, a practice football field, enclosed in a running track and four or more tennis courts.
   b. The existing high school football stadium will be utilized for varsity football games, if this sport is adopted.

7. Provide parking for approximately 1,800 cars about equally divided east and west of campus.
   a. Avoid student foot traffic across perimeter road and across parking lots.
   b. Provide many smaller parking areas, rather than few large ones.

8. Develop campus in an orderly manner, as financing for construction becomes available. The following priorities should be followed:

   Phase I

   a. Library-Learning Center
   b. Science Technology Complex
   c. Academic Classroom Complex I *
   d. Trades and Industry Comples *
   e. Physical Education Center *
   f. Multi-Purpose Complex *

   * Incomplete complex in Phase I.

Phase II

g. Student Center
h. Academic Complex I **
i. Academic Complex II **
j. Trades & Industry Complex **
k. Multi-Purpose Complex **
l. Administrative Center
m. Maintenance & Storage Center
n. Physical Education Center **
o. Planetarium

** Additions to Phase I buildings.

9. Academic classroom complexes are not to identify with a major division of the college. The campus is to reflect the philosophy of integrated and closely interrelated departments. Tendencies for divisions and departments to "empire build" and become autonomous within the college are common and planning should forestall these inclinations as much as possible. Faculty offices will be closely related to each other.

10. It is anticipated that a large auditorium is to be planned in the new Auburn Civic Center. A location for such a facility should be considered in connection with the college in the interest of good master planning; however, it is unlikely that two such facilities will be built in the community.

The Architectural Criteria (in order of considered importance)

1. Provide a campus that can be adjusted to the needs of the future.

2. Design the buildings and spaces between the buildings to recognize the nature of the wooded site. Disturb existing grades and flora as little as possible. Avoid cutting merchantable timber; it must be purchased from the State under the terms of the lease.

3. Consider climatological conditions in siting of buildings.

4. Consider proposed development of adjacent streets and arterials, neighborhoods, high and elementary schools, and parks. Coordinate with King County Planning Commission.

5. Plan a total environment to stimulate the students' appreciation for learning and respect this established environment with all new construction as the campus develops in the future.

6. Keep campus as compact as possible to facilitate student circulation.

7. Locate and design parking areas to be as inconspicuous as possible and not obscure view of campus from South 320 Street.

8. Avoid, as much as possible, conflicts between building service traffic and student traffic.

9. Recognize vista toward Mt. Rainier and acknowledge gentle slope of terrain to the east and southeast in building design.

10. Utilize entire site, including the river, and existing virgin timber and all species of flora as outdoor teaching facilities and retain the wilderness quality unique to this campus.

11. Use "dead end" concept for auto traffic to parking areas rather than through-traffic around campus via a perimeter road.

12. Provide access to all buildings for handicapped students as well as service equipment

13. Provide buffer strip on north and west property lines by maintaining a thirty foot wide strip of trees. Establish athletic fields near west property line to further separate campus and parking from future residential zoning. Anticipate dedication of thirty feet to King County for street right-of-way on north and west property lines.

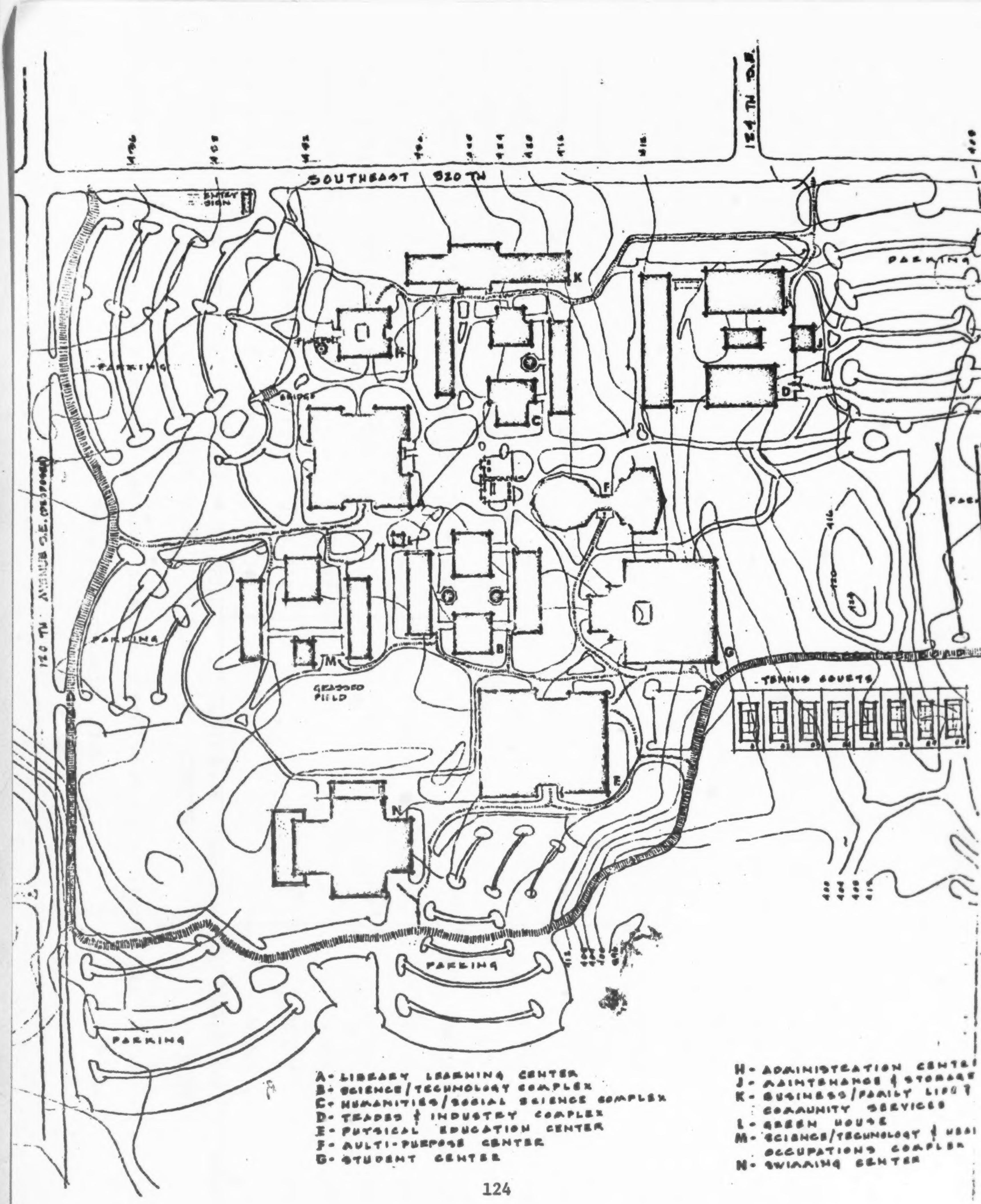
14. Limit auto access to campus in order to minimize control.

15. Design a heat distribution system that minimizes the need for extensive and costly underground tunnels or trenches, which must be over designed in the initial phase to accommodate future demands.

GREEN RIVER COMMUNITY COLLEGE

Recap of Buildings: Buildings 1 through 8 completed; 9 through 11 will go to bid in December 1969.

| Building | PHASE I<br>* | <br>Sq.Ft.Area | <br>Students | PHASE II<br>* | <br>Sq.Ft.Area | <br>Students | TOTAL<br>Sq.Ft.Area | <br>Students |
|---|---|---|---|---|---|---|---|---|
| Learning Center | 1 | 29,460 | 340 | | | | 29,460 | 0 |
| Science & Technology Complex | 2 | 32,055 | 519 | | | | 32,055 | 519 |
| Academic Complex I | 3 | 19,079 | 435 | | | | 19,079 | 435 |
| Trades & Industry Complex | 4 | 26,987 | 101 | 13 | 20,075 | 75 | 46,608 | 176 |
| Physical Education Building | 5 | 27,915 | 120 | 15 | 8,838 | 100 | 36,753 | 220 |
| Performing Arts | 6 | 10,402 | 140 | | | | 10,402 | 140 |
| SUB-TOTAL PHASE I | | 145,898 | 1,655 | | | | | |
| Occupations Education Building | | | | 7 | 10,260 | 210 | 10,260 | 210 |
| Developmental Center (temporary building) | | | | 8 | 3,120 | 100 | 3,120 | 100 |
| Student Center | | | | 9 | 42,150 | 0 | 42,150 | 0 |
| Office Occupations, DE, and General Business Building | | | | 10 | 14,600 | 250 | 14,600 | 250 |
| Social Science Building | | | | 11 | 9,600 | 350 | 9,600 | 350 |
| Science & Technology | | | | 12 | 29,886 | 610 | 29,886 | 610 |
| Creative Arts Building | | | | 14 | 28,000 | 360 | 28,000 | 360 |
| Developmental Center (permanent building) | | | | 15 | 8,000 | 100 | 8,000 | 100 |
| Administration Center | | | | 16 | 6,700 | | 6,700 | |
| Swimming Pool | | | | 17 | 24,000 | 50 | 24,000 | 50 |
| SUB-TOTAL PHASE II | | | | | 205,229 | 2,205 | | |
| TOTAL | | | | | | | 350,673 | 3,520 |


SOUTHEAST 320TH
124TH S.E.
120TH AVENUE S.E. (PROPOSED)
ENTRY SIGN
PARKING
BRIDGE
FLAGPOLE
GRASSED FIELD
TENNIS COURTS
A
B
C
D
E
F
G
H
J
K
L
M
N
A- LIBRARY LEARNING CENTER
B- SCIENCE/TECHNOLOGY COMPLEX
C- HUMANITIES/SOCIAL SCIENCE COMPLEX
D- TRADES & INDUSTRY COMPLEX
E- PHYSICAL EDUCATION CENTER
F- MULTI-PURPOSE CENTER
G- STUDENT CENTER
H- ADMINISTRATION CENTE
J- MAINTENANCE & STORAGE
K- BUSINESS/FAMILY LIFE &
COMMUNITY SERVICES
L- GREEN HOUSE
M- SCIENCE/TECHNOLOGY & HEAL
OCCUPATIONS COMPLEX
N- SWIMMING CENTER

# THE PLANNING AND CONSTRUCTION OF SOUTHERN NEVADA VOCATIONAL-TECHNICAL CENTER

Clayton E. Farnsworth, Director
Southern Nevada Vocational-Technical Center

It is a genuine and real pleasure for me to be here at Fort Collins and to have the opportunity to renew some choice friendships. A little over a year ago, I participated in the Occupational Analysis Institute held on this campus. It was also directed by Dr. Larson, and I can honestly say without any reservation that it was one of the most enjoyable and profitable experiences I have had in my 20 years of working in education.

I consider it an honor to be on the same program as Mike Russo, Dr. Walter Arnold, Dr. MacConnell, Dr. Mehallis -- all of whom I know -- and the other outstanding presenters that you have had and will have the pleasure of hearing here at this Institute.

Knowing Dr. MacConnell's ability as a story teller, I am a little hesitant when it comes to trying to complete, but I would like to share one story with you before I start my formal presentation.

During the last Republican National Convention, a rather interesting event occurred. Mr. Nixon went down to one of the sessions, and as he entered the hall he observed a rather large group of people near the speaker's rostrum. They were laughing and pointing at a lady who was walking in his direction. He noticed that as she came closer other delegates throughout the hall were also pointing and laughing at her. Mr. Nixon was quite concerned at this conduct and felt it was rather unbecoming to this distinguished group. As the lady came closer, he noted that she was very pregnant and this really disturbed him to think that people would treat prospective motherhood with such levity. As he was about to condemn the delegates, the lady turned and walked in another direction, and as she did so, Mr. Nixon discovered the reason for all the attention she was receiving. Across her back was a sign, and on the sign were the words -- "DICK NIXON IS THE MAN!"

Well, for the next forty minutes, I am the man... and my assignment is to acquaint you with some of the planning and construction procedures that we used in putting together what I consider one of the finest area vocational-technical centers in the country.

Planning for the Southern Nevada Vocational-Technical Center was commenced several years in advance of the actual construction. During the 1962-63 school year, the Clark County School District conducted several studies and an extensive survey in an attempt to determine the need for an Area Center -- a Center that would realistically meet the needs of high school students and adults of our area who were not college bound and who desired extensive training in the occupational areas that would permit them upon completion to enter directly into employment.

The studies and survey results revealed a great weakness in the District's effort to provide total education. The studies clearly revealed that in-depth training in the vocational-technical areas was virtually non-existent in the Clark County School District. On the strength of these findings, the Board of School Trustees and the School Administration felt the Center was a must item. On the basis of this decision, we applied for a grant from Educational Facilities Planning Lab to be used specifically to do the planning necessary to develop the specifications that we felt were necessary to provide a Center that would do the job we wanted done.

Dr. O'Dell and Dr. MacConnell, who addressed you yesterday, and associates out of Stanford University were employed by the District as educational consultants to work with a master advisory committee organized in the District to develop the educational specifications for the Center.

They were given the responsibility of developing educational specifications that would eliminate the deficiencies in the total educational picture of Clark County School District as pointed out by the studies and survey conducted.

After the educational specifications were developed, a major conference was held. At this conference were national, regional and State leaders in vocational education as well as representatives from industry, business, labor, management, and top civic and educational leaders from the Southern Nevada area.

The purpose of this conference was to reveal the results of the District's survey and studies and to stress the need in the Southern Nevada area for good occupational education. It was also to discuss the educational specifications, the instructional program necessary to implement the specifications, and the architectural solution necessary to meet the educational needs.

The information presented at the conference was enthusiastically received by all present, and an endorsement was given to proceed with the planning.

The architectural firms of William Blurock and Julius Gabriele were employed to develop a campus master plan and construction plans for Phase I. It had previously been determined that the physical facilities would be constructed in phases to meet the needs as they arose. Ultimately, the facilities would house 5,000 daytime students and up to 7,000 evening part-time students.

After the total facility planning was completed, another major conference was held to obtain community support for the developed plans and for the bond issue that would provide the funds for Phase I construction.

The bond election was held in May of 1965 and was successful by a big majority. Construction contracts for Phase I were awarded on June 4, 1965 with construction scheduled to commence on July 1.

In education, generally, it is not the policy that the person who is given the responsibility of opening a new school has the opportunity of being placed on the job well in advance of the opening date. However, in this case, I was employed in March of 1965 (a year and a half in advance of the time the school was scheduled to open) to coordinate the total planning and construction effort and to place the new Center into operation.

As we were working against a deadline on plans for Phase I, my first responsibility was to work with the architects and advisory committees to finalize the construction plans. From the very inception of the planning for the Center, there had been a close working relationship between the people of our area, the School District personnel, the architects, and the State Department of Vocational Education. I was determined to maintain that fine relationship with all of the above listed groups, and I organized sixteen major advisory committees made up from representatives of the aforementioned groups -- one advisory committee for each area of our curriculum. These people were asked to help with developing the final construction plans for Phase I. Many of the ideas, suggestions, and recommendations made by these committees were incorporated into the final construction plans. As we were working with a limited budget, as we so often are in education, not all of the recommendations and suggestions of the advisory committees were included in the plans. However, we were careful to point out to our committees our reasons so they would understand why these were not used.

While the plans for construction were being finalized, I also began to develop and draw together the total comprehensive plans necessary to put the Vocational-Technical Center into operation. In this comprehensive planning, I used the PERT method. I know that Mr. McKee will be discussing PERT Planning with you tomorrow so I will not spend much time on this system other than to say, that without that system of planning we would have been in real trouble in the last few months of our efforts to open the Center on schedule. We encountered some unexpected reversals and had we not used PERT we would not have been able to come close to meeting our schedule. As it was, we open on time.

By using PERT we eliminate the haphazard planning that has often been used by educators. We identified jobs that had to be completed. We then assigned these job responsibilities to the various departments of the District that would be responsible for their completion. We asked them to PERT out the identified responsibilities and to indicate time factors. From the information gathered, a master PERT plan was developed indicating responsibility and time limits on all departments involved. I have for your viewing a copy of the plan we used.

Generally speaking, the responsibility for opening new facilities and new programs puts a tremendous strain on administrators. This was minimized in this case by use of PERT planning.

After the planning procedure was completed, I continued to work closely with our different advisory committees to develop tool and equipment lists for our various programs. As instructors had not been identified at this time for the programs, I found these committees invaluable in this process.

The committees also helped us develop lists of job skills that should be taught and learned in each area of our total curriculum. These lists were extremely valuable to us as our instructors began to develop their curriculum guides and course outlines.

By correlating the job skills needed to be learned, and the tool and equipment lists, it was an easy task to make determinations as to what items were "must items" in the programs. We were also more able to make decisions as to which ones would be nice to have and those that could be added later. This information was extremely helpful as we began the process of purchasing. As instructors were identified and employed, we found we had to make very few changes, additions, or deletions to the lists that had been developed by our committees.

## CONSTRUCTION

In construction planning for the Vocational-Technical Center, it has been agreed that this Center must reflect prestige to counteract the second-rate education image constantly associated with vocational education. It was also agreed that flexibility must be a paramount consideration if the Center were to ultimately fulfill the purposes and objectives of the educational specifications that had been developed.

## SITE

The Vocational-Technical Center rests on an exceedingly interest-site. It stands high on a Mesa about 100 feet above the desert floor on a truly virgin piece of ground that was purchased from the Federal Government for $2.50 an acre. There are 390 acres in the site.

There were some rather interesting problems that had to be considered in construction because of their relationship to the nature of the site. For example -- the wind could be blowing moderately in the downtown area, but rather fiercely at the site. Therefore, the wind problem had to be given much consideration. If it was 100 degrees in the city, it could well be over 100 out at the site, and on the other hand, if the temperature is down to 25 to 30 in town, it could well be 10 degrees colder at the Center. Temperature considerations were a very real problem. These problems did create unique construction problems.

The project was oriented architecturally and esthetically to the ground available. There was absolutely no way that extensive landscaping could be introduced on the site. Therefore, the architects used the approach that they would run the desert right up to the school. They wanted the site to appear uniquely Southern Nevada desert in nature without seeming to be a transported situation from California or some New England area.

The architects also tried to enhance the architectural character by taking some of the lava rock already on the site and blend it in limited quantities with the walls for its esthetic effect. The color of the lava lrock is a rich chocolate brown and is used to contrast the white concrete tilt-up slapbs used in the Student Center and Administration complex. (See slide showing approach to Administration Building).

Some small trees and plants and coast landscaping was used, but mostly the natural terrain was utilized.

Mr. Bill Blurock, one of our architects, said, "It is my opinion that we have brought together an interesting distribution of materials, color, lines and textures unlike anything we have seen elsewhere. This gives this Center an atmosphere of dignity and dignifies the entire setting".

Again, you can see we were striving for an image that we felt was most important.

## THE FACILITIES

Typically, when vocational-technical facilities have been tried or combined with another type of facilities, the academic requirements always take the front row -- they are up by the Library -- they're out where everyone can see them -- and they are clean and pretty. On the other hand, the shops and vocational-technical areas are out in the "back forty" somewhere. At our Center, we wanted to break this practice and bring these areas to the forefront. We wanted to accentuate the Vocational-Technical aspect. To do this everything was placed around the Student Center, making a free area for study, for eating, and a ready access to the various Voca;tional-Technical components. (Slides on Student Center).

As you can see from the slides of the shops (Slides to be shown here), we tried to get rid of the common shops and replace them with instructional areas. Such an area can be used for student classes, for display areas, or to assemble and repair automobiles, airplanes, appliances, etc. No one can ever confuse this approach to flexibility with the old, tired-looking vocational shops commonly seen in vocational facilities. The lobbies, corridors, and classrooms are all carpeted and have other acoustical treatment throughout. This treatment controls almost completely the problems dealing with excessive noise.

The Student Center was conceived so that the Library and its carrels, adjacent open spaces, classrooms around the upper floor, and the faculty dining area would all be together. The upper balcony in the Student Center houses our Culinary Arts program. This area permits students to prepare the food that is eaten by the staff and guests. In addition to preparing the food, the students can serve it also, with both the preparation and serving being in the interest of instruction. All the facets of the food program from gourmet cooking to snack food preparation, to serving, to dishwashing is taught in the facilities just off the Student Center area.

The Resource Materials Center just completed in our second phase this year is an extension of the open concept we used in Phase I. It is divided by levels so you can see the materials but can't reach them except through a Central Control desk. Within the Materials Center is an audio-visual section which is also a controlled center where students can obtain instructional materials that are passed over a counter. Also in the Materials Center is a dial access audio retrieval system. This system provides a limited program offering but is being expanded and will ultimately be tied with video retrival as we individualize our program offerings.

We are now making plans to add a closed circuit video system with programs being available to students on small monitors available in the Control Center.

As you can see, the open concept and the accompanying flexibility was stressed in our planning and construction. We, like most of you, do not know what the future will bring and what programs may be offered in the years ahead, but we feel that with the type of facilities we have constructed, we will not be obsolete for many years to come. With the facilities located on our campus, we can readily make the modifications that may be necessary in the years ahead to house the program changes that may come about.

A representative of Philco Corporation once told me that his company could take over our Center and within a matter of a few days could modify it into an industrial plant. As I thought about his statement, I was pleased -- because that was the type of flexibility we were attempting to accomplish.

# BUILDING FOR THE FUTURE OR "CONFRONTING CHANGE -- THE CHALLENGE OF LEADERSHIP IN OCCUPATIONAL EDUCATION"

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As we examine our society, it is apparent that changes occur with surprising speed and frequency. Change has become the modus operandi in our society and change is constant. As leaders in occupational education, we have the responsibility to: (a) provide all the avenues through which needed, suggested and impending changes may occur, and (b) assist in permitting the changes to affect (in a positive way) the educational organizations with which we are associated. As we look upon the great number of changes occurring in society, we may also reflect upon the common axiom of our day, "nothing is more permanent in contemporary society than change."

Modern occupational education leadership, in order to cope with change and its effects must develop a philosophy, or at least a modification of its existing philosophy; this acquisition of a philosophy should prove useful in udnerstnading the nature of the changes which are impacting upon society now, and should be helpful in adapting to those changes which are most certain to come. Such a philosophy should also anticipate the constant and ever increasing need for change, as well as the parameters of such change. In its final analysis, leadership in occupational education must not only be aware of the development, the actuality and the impact of change, but must also establish practical methods within its operations which allow it to translate the philosophy into program of action. As a matter of fact, whether to, what to, and how to supervise, administer, lead and encourage has become a major consideration related to the ultimate responsibility of leadership in occupational education. This is a most comprehensive task, and requires that leadership consider (somewhat reluctantly in some cases) degrees and flexibility in thinking, planning and acting in making an accommodation to the rapidly changing world of work, as well as to permanency of change as a way of life.

In the field of education, change which has never been accepted with noticeable speed, is often regarded with suspicion and always subjected to experimentation and research. Many of the popularly reported changes which we read about in our journals, magazines and newspapers, and see in such dramatic circumstances on our television sets, are occurring in the nation's schools, colleges and universities. Many of these actual and proposed changes are indicative of changes which have been occurring in education during the past 25 years. During this period the educative porcess changed its target from "revelation of ideas" to one of "helping the learner to help himself." Thus, 25 years later some of the individuals who have been encouraged to think and to help themselves have now thought, and are presently demanding that changes be made. The process which was begun some 25 years ago has continued and today's college and university student is a thinker, a planner and a suggester of change. It would appear that the problems which have developed in so many instances are indications of supervisor and administrative inflexibility to change, and the recent sit-ins and confrontations at several of our large universities illustrate this point. For example, when the president of one of the nation's large universities refused to recognize the students who were anxious for discussions relative to changes in education involving procedures and methods, real problems developed. The reluctance and inflexibility on the part of administration resulted in a confrontation which in turn produced confusion, and distrust for the university which may take many years to disperse. Similar circumstances have occurred in other schools and universities, but until such time as the leadership in education is willing to entertain and consider discussions relative to change, and the impacts of such changes, and to involve itself in the planning for change, confrontation and confusion will probably continue!

Other changes in the field of education are numerous, particularly in the areas of supervision, administration and instruction. Scarcely a school system in the nation can long remain unaffected by the procedures and processes made possible by electronic data processing, for example. The impact of the computer upon American education in about every aspect may be noted, and while many of the changes which have already been adopted and acted upon by other agencies have yet to receive appropriate attention in the field of education, changes to be wrought by the computer in the field of education are inevitable. These changes must be accommodated!

In the world of business and industry, electronic, pneumatic, hudraulic devices and combinations of these technological changes are daily occurrences. Examples may be found in the manner in which inventories are maintained, and accounting, sales, marketing and pricing procedures are developed and put into action. Credit cards, electronic bookkeeping systems, electronic billing systems, are the rule now instead of the exception.

This type of development and change has displaced many of the earlier types of employees whose responsibilities and skills have become outmoded, and has brought about specialized vocational leadership responsibilities which must anticipate impending change.

In the broad field of manufacturing and heavy industry where products and goods are prepared in quantity for the 200 plus million American consumer population, technological changes are apparent.

Occupational education leadership has a responsibility here, too, as it confronts change and recognizes the necessity for dislocations of personnel now and for those dislocations that will most assuredly continue to occur in the future. Leadership responsibility in occupational education will have to anticipate the release of those who cannot be retrained for other places within the organization, as well as the transfer (or assistance in transfer) for those who will have to seek assignment to other parts of the organization. *Above all, leadership in occupational education must acquire a functional philosophy which is rooted in change.*

Change has also occurred and will continue to make an increasingly noticeable impact upon the professional fields of medicine and law. Already available in one of the nation's largest establishments at Waltham, Massachusetts and completing its pilot run in several of the cities in the Waltham area is the big General Electric Data Banking and Coordination Unit available to doctors in hospitals and in private practice. Known as Medinet, over the past five years the General Electric Company has been data-banking symptoms and analyses relative to all kinds of medical and surgical problems of human beings. In its pilot operation, it has been possible for hospitals to request of centralized computers alternate and collective analyses for situations confronting patients, on the basis of electronic symptom inputs. The electronic diagnosis has already made its impact upon the medical and surgical field and will continue to cause change to occur in medicine and in surgery, as well as in the health and allied fields of education for the occupations. A similar procedure has already started in the field of law, and the changes which have occurred here will most certainly bring about continued change in the conduct of the practice of law and in the education of persons for the law and associated fields. Endless searches through law journals and law volumes in law libraries has long been a time-consuming and costly procedure. The advent of electronic data banking of information and processing of this information can now be on an almost instantaneous basis.

And what are the responsibilities and roles of leadership in occupational education as we confront these changes? They are many, and include the development of an overall philosophy which anticipates, encourages, welcomes and facilitates change. As these many changes occur, occupational education leadership will be confronted continuously with modifications of its role and responsibilities in connection with change. Leadership will have to ask itself constantly:

- *What* should we do?
- *How* should we do what we ought to do?
- *Who* should do it?
- *To whom* should we do it?
- *When* should it be done?

The following five major suggestions may be helpful to today's leadership in occupational education:

Point 1. *Leadership must involve people* -- In our fast-moving and rapidly-changing society, one of the most frequently overlooked principles governing most operations concerns the involvement of people. *People who are affected by change wish to be involved in the devices, procedures, techniques and methods through which these changes are to be accommodated in society*. Known as the *social process*, involvement is predicated upon the broad democratic principle that no action shall be taken on any matter which affects other human beings, except that they be involved in the deliberations concerned with the matter. The principle is psychologically sound and when used with wisdom tends to return dividends in understanding, support and the further relevation of good ideas and processes, all of which *may even tend to further accelerate change!* The acceptance of the principle of "involvement of all those to be affected by the change" should be carefully considered, since it has often been said that "all wisdom is not confined to leadership and management, and neither is it confined to those who by virtue of their age and point of service would presume to havepossession of the greater part of it." Good ideas and wisdom concerning change, innovation and new ideas may be found in all parts and corners of an organization, and capitalization upon these ideas may be profitable both from the standpoint of program efficiency and faculty support. The involvement of people in the matter of confronting change requires that all levels of leadership meet with people, discuss and confer with people, *and above all, listen to people*.

Point 2. *There must be communication (horizontal and vertical)* -- Leadership has a major responsibility in the matter of keeping open (both horizontally and vertically) the channels of communication. This leadership responsibility has its roots in the principle of involvement of people, and it is a device for the further and more extended involvement of all persons within the structure. Through an adequate system of communication, it should be possible for administrators, supervisors and teachers, and others in the structure to communicate new ideas and suggestions, to request advice, to seek help and to share with people in the organization the possibilities, probabilities and impacts of impending changes.

Such communication must use the language level and the terminology understandable to all members of the organization, and every effort must be made to delete the "gobbledegook" and distracting terminology that often hampers communication. Education is one such occupational field where its leadership often loses contact with its constituency, and renders impossible the matter of communication, largely because of the tendency to use involved phraselogy, "gobbledegook" and "pedaguese." Possibly this is part of the reason why problems develop all the way from administrative levels to the student body.

More than anything else in the field of communication is the need to keep much of the information which in the past has been reserved only for personnel at the top level, readily available throughout the organization.

Employees and colleagues must not be expected to receive accurate information by rumor, grapevine or through the efforts of locker room lawyers. This procedure is destructive of morale, and promotes resistance to the changes which must inevitably come within the educational organization.

Point 3. We must encourage creativity, innovation and new ideas -- Leadership in occupational education has an important additional role in confronting change, in making it clearly apparent to all members of an organization that new ideas result in added advantages to the youth and adult populations we serve. Leadership must identify and reward donors of ideas, using whatever procedure is appropriate within the organization. One of the most successful procedures to reward and further stimulate creativity to that of providing information to all members of the organization concerning the contribution made by the responsible individual.

The generation of new ideas to further improve occupational education and other segments of our society must not be left to chance. It needs constant stimulation! Leadership must continue to motivate the total faculty and staff to contribute to the well-being of that organization. Techniques such as buzz sessions, brain-storming sessions and rewards such as special recognition for suggested innovations must all be explored and communicated to every individual.

Total involvement, the social process, democracy in administration, human engineering or whatever one wishes to call it should be the accepted practice within an educational organization--*not the exception*!

Point 4. *We must measure and reward ability, creativity and innovation* -- The involvement of occupational education leadership in stimulating and motivating creativity and innovation in an organization can take many forms. The mechanical aspects of such patterns of stimulation can be highly objective in their respective approaches, but it is an entirely different matter to evaluate the results of the activities and to place upon the evaluation equally objective values. Where leadership in an organization sees creativity at work, innovation developing and ideas coming even from the remotest corners of the organization, it must make plan to recognize and evaluate each in some rank order of importance. And it should be one of the major responsibilities of leadership to involve people in such evaluations and measurement activities. *Involvement of all of the individuals in an organization in an evaluative process can often be induced initially through self-evaluation procedures*. Thus, individuals in an educational organization would have an active part in determining the broad guidelines and criteria against which their performance, ability, creativity and innovation might be scaled off, and they would *also* be involved in the pilot or dry-run procedures which would enable them to note the extent to which the guidelines and criteria applied to them had revealed their characteristics.

The final development of acceptable guidelines creiteria for the self-evaluation of individuals within an occupational education organization is a result to be anticipated with enthusiasm--but, *the process through which the total organization works and democratically develops its own procedures for measurement and evaluation is far greater in value than the end product*--the guidelines and criteria.

Self-evaluation, followed by peer group evaluation, both of which are based upon the identical criteria and guidelines, and participated in and understood by the individuals on whom the evaluation is visited, can be a strong force and device in the hands of leadership in occupational education for the purpose of measuring, evaluating and subsequently rewarding ability, creativity, innovation--change.

Point 5. We must identify personnel for growth and promotion -- While there are many broad guidelines concerning the responsibilities and roles of leadership in confronting change, this is the fifth and last to be presented here. Occupational education leadership has a responsibility to determine with reasonable accuracy the categories and numbers that will need to be prepared for staff and line positions within an educational organization. Because of the urgent need to identify and prepare future supervisors and administrators, the likelihood exists the leadership will have to bear the major responsibility for "hand-raising" such individuals, rather than to attempt to recruit them from other sources. Society today recognizes that there are far fewer people of a highly qualified nature available than the jobs which are looking for the people. Hence, leaders in occupational education should identify early those who have potential for growth, and through the evaluation and measurement procedures indicated earlier, identify those who have the characteristics needed to grow into positions of greater responsibility.

Following the identifcation of such individuals should be a well-organized program of internship or "apprenticeship" to provide the opportunities for each to acquire the skills, concepts and knowledges he will be expected to demonstrate, even while under the supervision and leadership of experienced colleagues. Aspects of the hand-raising procedure may include financial support of personal education programs, and opportunities for the identified individuals to participate in decision-making situations. What is indicated here is largely the development of the "understudy" procedure, which has long had good results in private enterprise. With each individual in an establishment making it his responsibility to bring along an understudy, and to provide internship, decision-making and participatory experiences, leadership in occupational education will fulfill one of its most important roles--that of providing a constant source of individuals who are ready to cope with change and who may qualify for higher duties and responsibilities.

We who are in the field of occupational education leadership have many responsibilities. These include communication, personnel involvement, evaluation, identification of potential growth personnel and the development of a philosophy which not only recognizes but encourages, anticipates and facilitates change. Leaders for today and tomorrow must look forward to change bringing about every-increasing change. This should not dismay us. Rather, we must learn to harness change to our requirements, and match the devices and procedures at hand to the tasks we have to perform.

# CONSTRUCTION COSTS AND METHODS OF FINANCING COMPREHENSIVE VOCATIONAL FACILITIES FOR THE FUTURE

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## I. Introductory Statements and Conditions of Premise

A. Buildings, facilities and equipment should result from considerations of determining factors:

1. Philosophy (provincial or broad area)
2. Who is to be served (clientele and number)
3. What is to be served to them (curriculums)
4. Who will do the serving (faculty)

B. Construction costs and equipment costs cannot be precisely pre-determined. They follow consideration of:

1. Those to be served
2. Level of instruction (secondary, post-secondary, adult, disadvantaged or all of these)
3. Depth and breadth of instruction to be provided

C. Costs of construction vary by areas of the country. Costs per square foot, including equipment installed at the time of construction by the contractor, may vary from $18 to $20 in the south to double that in the industrial northeast. Labor organizations may have a significant role to play in the determination of construction costs.

D. Instructional methods anticipated for a new or remodeled facility will be reflected in the construction costs. Decisions to use individualized, class, large group, small group, C.A.I. or all of these methods will be reflected in construction costs.

E. "Rules-of-thumb" exist for estimating construction costs. These must be adjusted, modified and/or compensated for in every specific instance.

II. To illustrate briefly one or two of the points made above, the factors contained in the following statement may deserve consideration and discussion. It should be understood that while "rules-of-thumb" may suffice to provide the most general estimate of what the cost might be to build and equip a vocational education facility, projections of actual costs can only be made following the determinations mentioned earlier, and some others that are mentioned in the following statement.

Many educational administrators appear to be in a quandary with regard to the facilities that will be needed to prepare youth and adults for the world of work. Many of these new and proposed facilities are in the planning stages now, and will soon take form, be constructed, and be put into use for the preparation of tomorrow's craftsmen, technicians and skilled workers. Some of these facilities will require that extensive provisions for building flexibility be an integral part of the original plans, while in other situations the facilities will resemble very much traditional structures and those that are currently in use. For example, in the preparation of those who are to go into the skilled trades areas, the facilities currently in use. For example, in the preparation of those who are to go into the skilled trades areas, the facilities currently in use for the preparation of brick masons, carpenters, mechanical draftsmen, machinists, tool and die makers and other such fields of endeavor will require only a few changes in the building facilities. Changes in equipment and changes in curriculums will necessitate few building changes. The usual shop areas, the provisions for overhead ducts to supply electricity and power to the equipment, tool cribs and supply rooms will undoubtedly remain essentially the same with regard to space requirements, shape and placement. However, other vocational and technical areas of instruction will require considerably more in the way of change, and these are apparent when one examines today-s facilities. Particularly in the case of data processing for business and scientific purposes, and in the field of electronics, nucleonics, refrigeration and air conditioning and other similar fields, many of the facilities already in use are out of phase with modern technology. Technology in these fields and other similar fields has advanced the respective arts so rapidly that the facilities for the future will have to reflect not only the changes that are occurring today but those which may be anticipated by some degree of certainty for the future. This can be difficult, and will undoubtedly constitute a major problem for the building advisory committees and the architects.

Other changes in facilities for vocational education will come about due to changes in teaching technology and methodology, and by virtue of the suggestions and even the demands of students. For example, youth in today's vocational education programs have been counseled during their early years in school to be discriminating, critical, forthright in their judgments and cognizant of the democratic procedures for effecting change. Thus equipped, many of the students are now asking for far greater personal attention in instructional situations. Greater use of individual instruction procedures and more attention to the modern teaching methodologies and equipment will tend to bring about changes in facilities. Greater attention to individualized instruction may mean smaller classrooms, smaller laboratories, and certainly use of the modern mechanized and electronically controlled devices for enabling students to receive their instruction at their individual rates of learning. Classrooms for the future may be equipped with many carrels in which computer-assisted instruction may be the procedure used for facilitating individualized instruction. Other carrels may make use of visuals, audio materials, and combinations of audio visual materials. Teacher utilization of these individualized instruction procedures will produce far different characteristics within the traditional classroom and laboratory, inasmuch as the extent of the use of the new technological devices has already become a function of the preparation of today's teachers. Colleges and universities preparing teachers for today's schools are emphasizing the use of modern devices for individualized instruction, and teachers during the next decade and thereafter will certainly be affecting the changes in facilities necessary.

Another technological impact upon instruction which will affect facilities is closed-circuit television. Several years have passed during which open-circuit television or live broadcast television was experimented with and attempted in the public schools. Facilities and equipment were provided, and research has been conducted. However, the potential of live or open-circuit television is yet to be realized. On the other hand, experimentation and many evidences of success in the closed-circuit field have induced some to make effective use of the medium. Live or broadcast television appears to have far too many obstacles in its way for it to be an influence upon the design of facilities for the future. On the other hand, closed-circuit television used in the laboratory and chiefly for the purposes of "electronic magnification" has demonstrated efficiency and has potential for changing the instructional methodologies used in many laboratories and classrooms. The design of many of the classrooms and laboratories where closed-circuit television will receive its greatest utilization may be a factor. Tiered lecture rooms for small classes, and classroom arrangements to enable students to view monitors with greater concentration and flexibility will be in the planning stages for the future. Even built-in or wall-type monitors and flexible camera arrangements will require reconsideration of the space requirements in the usual vocational classroom and laboratory.

Tomorrow's vocational school facilities must also reflect some of the economies so critically needed in the public and private school expenditures for secondary and post-secondary shop and laboratory facilities. The investment in separate facilities for both secondary and post-secondary vocational education are considerable, and in many cases could, or should, be combined into a single set of facilities, thereby saving the tax-paying public many dollars for duplication of facilities. Over 200 such institutions have now been built, in which grades 9 or 10 through 14, complete with laboratories and shops have been organized and designed to provide vocational education.[1] Joint use of facilities and careful scheduling to allow both secondary and post-secondary students the use of the shops and laboratories will certainly require reconsideration of the design, arrangement and numbers of classrooms, laboratories and shops within such an institution. Equipment in laboratories and shops to serve several different objectives and purposes may require much larger facilities, a different arrangement of equipment, provisions for several different kinds of supervision, and shop reference and library facilities of several different kinds. The emphasis on joint use of facilities will be a strong influence in the future, particularly since federal vocational legislation in the 1968 Amendments to the Vocational Education Act of 1963 makes it clear that funds of a vocational nature may be used on a secondary level for two quite different purposes. One purpose would be to prepare the secondary school youth for direct entrance into the world of work and the other purpose would be to use the vocational dollars in facilities of a nature that would be of assistance in preparing the youth for further vocational-technical education on the post-secondary level. Putting these new regulations (and certainly a variance in philosophy) into operation will require careful consideration by building advisory committees and architects. To do otherwise would perpetuate the practice of building separate facilities for secondary students and for post-secondary students, on the sole premise that grade levels must be separated.

Facility planners for vocational facilities, particularly in the secondary schools, will have to give a great deal of attention during the coming years to additional provisions identified in current federal legislation. These provisions recognize the rather limited facilities that have been provided youth prior to their selection of an occupation for ultimate specialization. The need for all kinds of orientation, exploratory experiences, opportunities to engage in the practice of initial skills, and the great need for quantities of current occupational information are identified as urgent in the federal legislation. Facility planners must be cognizant of these needs and take appropriate steps to provide facilities that will enable, encourage, and stimulate young people in the middle grades and even farther down into the grades to make use of the secondary school facilities for the above purposes. During the school holidays, during the long summers and during other times in the year when the secondary school facilities can be scheduled for the use of the grade schools, multiple use of the facilities would be a possibility. Thus, many grade school children should be enable to obtain first-hand experiences, orientation and exploration relative to a wide range of modern occupations. As a prerequisite to vocational education, the procedure will enable many more young people to make valid judgments concerning the occupations they wish to avoid subsequently, and those they wish to consider further. Planners of vocational facilities will need to keep the multi-purposes of the facilities in mind at all times, in order that the facilities and equipment may be "worn out in the interest of youth and adults." The utmost flexibility in building design should be the objective, with every possible opportunity exploited to accommodate the needs of all who desire information, orientation, exploration, skill training, or retraining for the world of work.

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[1] Report of Vocational-Technical Education for 1966, United States Office of Education, Department of Health, Education, and Welfare. Available from United States Government Printing Office.

## III. Methods of financing vocational education

At this point, construction costs (and methods of financing construction and equipment) needs to be given further consideration.

There are about as many different ways of financing vocational education in the United States as there are different kinds of programs. Some vocational programs operate directly under a public school board, others operate under a public board or under a board for higher education; still others operate and are conducted by trustees who in turn report through a board of higher education or a board of regents. Many others kinds of programs of city-wide, county-wide, or state-wide nature are conducted in the nation. It is not so much a matter of the organization structure under which the program of vocational education is to operate, as it is the intelligent management, organization and financing of the program of vocational education which takes into cognizance all factors of clientele, curriculums and level of instruction. At one time, it was believed that a small state could best construct and operate its program of vocational education by adhering to a central state control system of its schools, and a central state financing procedure. This was the pattern that was developed in Connecticut, and is the one under which that state is still conducting its vocational programs. The size of the state (which was a contributing factor in Connecticut) quite evidently did not affect ultimate judgments when the State of North Carolina developed its extensive system of Industrial Education Centers in the mid-fifties, and later converted them to a system of comprehensive community colleges, and technical institutes. Here the size of the state apparently made no difference. Other states as Florida, California, Iowa and South Carolina organized quite extensive statewide programs in the field of vocational education. It would take much time to discuss the differences and the relative merits of each, but suffice it to say that with the needs of the state, the merged areas and the regions of the respective state under consideration in each case, the merits of each type of state system may be successfully defended. However, there are characteristics of each which when singled out bear specific mention and attention. In the case of the statewide operation of vocational education programs in Connecticut, the schools in that state were constructed and equipped by action of the General Assembly; then totally owned, conducted, staffed, maintained and supplied by the same agency. This pattern of organization results in many similarities in the preparation of the nineteen Connecticut institutions, much flexibility and to some extent commonality of purpose. On the other hand, when one studies the system of over fifty individual units which now comprise the statewide Community College System in North Carolina, each of the institutions has its own respective board of trustees and is particularly responsive to the needs of its immediate region. The programs of vocational education offered in each of the units is generally identified with the region. The development of a vocational program in North Carolina requires considerable local participation, local funds and local initiative. The feeling that the school is part of the region, and is the result of regional need and determination to have a program of vocational education is a strong argument for local participation.

The investment of funds in vocational education for the future will be considerable, and will undoubtedly require that several regions or even counties join forces in the construction of plants and in the provision of equipment for the preparation of personnel for the world of work. The State of New York with its rather extensive BOCES has done much to bring to the attention of the nation the thinking and devices that might be brought to bear upon the problem of providing regional vocational educational services for students. The Board of Cooperative Educational Services (BOCES) has made it possible for several counties to cooperate in the financing of a particular service or facility needed by students in any part of the state. Approximately fifteen BOCES areas were established and studies conducted during the last five years, out of which came recommendations for the provision of vocational education facilities to meet the needs of youth and adults in the several regions. These BOCES units require that several areas or counties merge on the matter of coordinating their resources and their personnel in order to plan, organize, supply, equip, administer, supervise and finance programs of vocational education. State support is provided and through the Office of the State Director of Vocational Education, some federal funds are also provided for this purpose. This is an especially effective means of providing services in areas where any one region, town, city or county would find it much too much of a burden, were it to begin operation of a vocational facility entirely on its own. Large regions of other states have also given much thought to the provision of vocational facilities on a multi-county basis. Tehse are illustrated by the very successful Penta-County Vocational School in eastern Ohio, and by the four-county project in east central Illinois, in which Champaign, Douglas, Ford and Piatt counties joined forces, intelligence and dollar resources toward the planning and construction of a post-secondary facility, and located it in Champaign County. On the eastern shore of Maryland, the same procedure was followed, and four counties (Caroline, Queen Anne's, Talbot, Kent) gave careful consideration to their vocational needs. Joining forces, county resources and educational leadership resulted in Chesapeake College, a two-year post-secondary institution, which offers vocational programs.

Obtaining the funds for constructing and equipping a vocational facility is (of course) fundamental to the entire project. City by city and town by town, the procedure varies for gaining access to the actual dollars. In some cases, it is required that all new school construction must be approved and funded by popular vote, a bond election, special action of the voters, action of a building commission, or even direct appropriation to a committee from a central treasury. In other cases, legislative building commissions make decisions and obtain financial support without resorting to a poll of the electorate. Procedures vary, but in all procedures it is contingent upon the vocational facility planner to clearly indicate the individuals to be served, the curriculums to be offered and possibly the socio-economic values to be received by the area served by the proposed institution.

In most cases, individuals are fully aware of the possibilities of the availability of local tax funds as well as state or county funds for constructing and equipping vocational education facilities. However, the need to carefully consider the sources of federal funds which might be provided for a variety of vocational education purposes is essential. Careful study of the Vocational Education Amendments of 1968 and other educational legislation will reveal that funds may be used for the construction of buildings and/or for the renovation of facilities for inaugurating a program of vocational education. Included in federal Acts that should be explored carefully for funds are those dealing with higher education, the Manpower Development and Training Act, the Appalachian Act, the Nurse Training Act, the "National SEA Grant College Act," the Elementary and Secondary Education Act and (hopefully) the proposed Comprehensive Community College Bill now under congressional consideration.

## V. Some Selected Factors Affecting Financing for Vocational Education

In this section of the paper, actual dollar figures are suggested. For example, figures are supplied in connection with the estimated costs for erecting and equipping a vocational facility to provide instruction for full-time all day students, as well as adults who would be attending evening, apprenticeship, adult and extension programs. The information indicates the extent to which site must be provided, and means for approximating the cost of the building. Each of the items is deserving of extensive discussion, but time does not permit this. References are made to specific items only, in the hope that attention may be drawn to those characteristics of the program of finance which are usually widely debated.

A cautious approach to probable costs of facilities is provided by the guidelines included in the American Vcoational

Association publication which discusses the need to be judicious in the choice of an architect who is familiar with the kinds of construction needed for vocational education.[1]

Guides to Building Costs

A. Site

Approximately ? acres at $0 to $5,000/acre including limited site improvement, test boring, etc.

B. Erection Costs

Approximately ? sq. ft. at $18 to $40/sq. ft. depending upon what is included in the construction contract (equipment?).

C. Contingency Fund

Approximately 5 per cent of the cost of erecting the building.

D. Architectural Fees

Approximately 6 per cent of the total of items B and C.

E. Estimated Equipment Costs

Approximated from similar vocational facilities--1/3 of construction costs. (Depends upon curriculums offered).

F. Cost of Purchasing Equipment

Office space, clerical and secretarial assistance, office supplies, etc.--5 per cent of the cost of the equipment.

The cost/square foot indicated is the one factor on which there has been great debate. In 1965, the United States Office of Education used $15.00 per square foot.[2] Recent buildings constructed in the industrial northeast have cost as much as $37.00 per square foot, while buildings constructed in the Carolinas have been shown to cost but half that amount. Needed in such instances is immediate and careful identification of what is included in the cost per square foot. On the one hand, all of the equipment which would ordinarily be installed by the contractor at the time of the construction is included, while on the other hand, no equipment of any kind is included in the building estimate. Also, poured concrete is used in one case while curtain walls and cinder block appear to suffice in another. Upon close examination of the construction plans and details, one often discovers that the range of a flat constant is not as extensive as might have first seemed to be the case.

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[1] Developing Educational Specifications for Vocational and Practical Arts Facilities, American Vocational Association, Washington, D. C., Circa 1963, 48 pp.

[2] Basic Planning Guide for Vocational and Technical Education OE-80040, 32 pp.

Attention is drawn to the item under building cost estimate which refers to the "cost of purchasing equipment." This is an item which often receives little if any attention in the planning and financing for a new facility. The actual cost of purchasing the needed equipment for shops and laboratories for a new building requires space rental, personnel, time and dollars, for contractual services such as telephone, telegraph and express, heat, light and in some cases actual travel to locations where equipment and other items may be see in operation.

In specific cases in which a facility offers only engineering-oriented technical instruction, a convenient rule-of-thumb may be used. This rule-of-thumb indicates that approximately $6,000 per student is needed to erect the building and to equip it ready for occupancy. This means, for example, that an engineering-oriented technical program, designed to accommodate approximately 600 students, would require very nearly $3.6 million for the erection of the building and for fully equipping it for day and evening instruction.

In instances where technologies other than the highly technical engineering-oriented variety are the concern of the administrator, other additional figures must be considered in the estimated costs. Thus, where business and secretarial types of technical programs are anticipated, a flat rule-of-thumb of $2,500 per student is adequate. Where a lower echelon level of technician training is the concern of the facility planner, still another figure may be used as a rule-of-thumb. In the training of these industrial technicians, (those who would normally find their way into mechanical drafting, architectural drafting, air conditioning and refrigeration, industrial electronics, industrial chemistry and similar fields), the rule-of-thumb of roughly $4,000 per student is appropriate. In addition, the rule-of-thumb which covers most of the health-oriented vocational programs is $3,000/student while the rule-of-thumb for the usual trade training curriculums is $4,500/student. It should be noted that depending upon the extent and depth of training provided in business office machines curriculums, the rule-of-thumb will approach either the $4,500 for trade training programs or the $2,500 for the business and secretarial curriculums. To recapitulate:

| Curriculums | Per Student |
|---|---|
| Engineering-oriented (post-secondary) | $6,000 |
| Business and Secretarial | 2,500 |
| Industrial Technician | 4,000 |
| Health-oriented | 3,000 |

| Curriculums | Per Student |
|---|---|
| Trade (Skilled Craft) | $4,500 |
| Business Office Machines | $2,500 to $4,500 |
| In addition: | |
| Agriculture and Ag-related | $4,000 |
| Distributive (and other types of Cooperative Vocational Education) | |

With a variety of rules-of-thumb to guide him, the vocational facility planner must consider all of the factors that impinge and very quickly bring about modifications of the rules-of-thumb. These factors include numbers to be served, groups (all-day, evening, apprenticeship, etc.) to be served, breadth and depth of instruction, and other factors.

A few additional rules-of-thumb are provided herewith. These concern the facilities that must be provided in future vocational institutional planning, and include dormitories and ramp-parking.

### Parking for Students, Faculty, Staff

A parked car on the average requires a space allowance 9' X 20'. (This permits 8' X 20' plus aisles).

With the above space allocation, it is possible for 161 cars/acre to be parked.

Costs: rules-of-thumb for construction:

In Southeast United States--Open high-rise parking deck, all above ground, including ramps, mechanical and electrical equipment etc. $6.60 to $9.00/sq. ft.

In Washington, D. C. and industrial northeast, excavation, retaining walls, with half of the parking ramp below ground level, mechanical and electrical equipment, ramps, etc. $9.20 to $11.70/sq. ft.

In Parking Ramps--As compared to ground level parking, allow 1/4 less parking because of ramps, supports, elevators, etc. This will result in approximately 124 cars/acre of parking space.

Example: The cost (at approximately $10.00/sq. ft.) to construct a ramp-type parking deck, exclusive of the cost of site, to accommodate 100 cars would be approximately $180,000.

## Residential Schools

Residential schools may soon become a reality in vocational facility planning, and a rule-of-thumb is supplied herewith, to be used only after considerations of what is to be included in a dormitory. Day rooms, library, cafeteria facilities and underground parking will all have an effect upon the rule-of-thumb. However, for two bedrooms and gang showers and lavatories appropriately spaced on each floor.

High Rise Dormitories may be constructed, depending upon the region of the country, labor costs, etc. at $16 to $20/sq. ft. This does not include cost of site, site improvement, test borings, etc. It does include architectural fees.

At the February 1968 American Association of School Administrators' convention at Atlantic City, New Jersey a fine display of architectural drawings for vocational facilities was provided. A resume' of the eleven sets of cost estimates is provided herewith although it should be understood that unless one knows, for example:

Who is to be served

How many are to be served

What groups asre to be served

What level(s) of instruction will be provided

What section of the United States is represented

Which curriculums are to be offered

Whether site and/or equipment is included

Comparisons between institutions on a cost basis will have little relevancy. Each school would need to be considered on its own and a determination of "what went into the mix" would have to be the first concern of the vocational facility planner. Special note, however, should be made of the number of new schools represented that will provide instruction of a vocational nature on both the secondary and post-secondary levels.

Berks Vocational Technical Center East
Berks County, Pennsylvania

88,400 square feet, 672 student capacity
Cost $1,862,000 exclusive of site
Grades 10-12
Cost/square foot $ 21.06
Cost/student 2770.83

Vocational-Technical School
Quincy, Massachusetts

235,000 square feet, 1,100 students
Cost $3.9 million
Grades 10-14
Cost/square foot $ 16.59
Cost/student 3545.45

Technical Vocational Institute
St. Paul, Minnesota

391,000 square feet, 1,800 students
Post-secondary
Cost $6,500,000
Grades 13-14
Cost/square foot $ 16.62
Cost/student 3611.11

Lee County Vocational Technical School
Fort Myers, Florida

30,500 square feet, 264 students
Cost $434,000
Grades 10-12
Cost/square foot $ 14.22
Cost/student 1643.93

Boulder Valley Vocational Technical Center
Boulder, Colorado

69,600 square feet, 365 students
Cost $826,000
Grades 11-14
Cost/square foot $ 11.86
Cost/student 2263.01

Ashtabula County Vocational School
Jefferson, Ohio

209,000 square feet, 1,500 students
Cost $4 million
Grades 10-12
Cost/square foot $ 19.13
Cost/student 2666.66

High School Vocational Addition
Corvallis, Oregon

43,500 square feet, 435 students
Cost $617,000
Grades 10-12
Cost/square foot $ 14.18
Cost/student 1418.39

North Schuylkill Vocational Technical School
Frackville, Pennsylvania

80,730 square feet, 590 students
Cost $1,381,000
Grades 10-12
Cost/square foot $ 17.10
Cost/student 2340.67

South Schuylkill Vocational Technical School
Pottsville, Pennsylvania

89,500 square feet, 650 students
Cost $1,488,000
Grades 10-12
Cost/square foot $ 16.62
Cost/student 2289.23

Ehove Vocational School
Milan, Ohio

186,300 square feet, 1,500 students
Cost $3,330,000
Grades 11-14
Cost/square foot $ 17.87
Cost/student 2220.00

Warren County Vocational Technical High School
Washington, New Jersey

86,300 square feet, 482 students
Cost $2,300,000
Grades 10-12
Cost/square foot $ 26.65
Cost/student 4771.78

For the 11 vocational-technical structures, and with programs of instruction varying by community:

| | |
|---|---|
| Average Cost/square foot | $ 19.84 |
| Average Cost/student | 2846.54 |

# PERT PROGRAM EVALUATION AND REVIEW TECHNIQUE

Robert L. McKee, Director
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## History

Perhaps the Navy description is the best and most complete: "'PERT is a statistical technique -- diagnostic and prognostic -- for quantifying knowledge about the uncertainties faced in completing intellectual and physical activities essential for timely achievement of program deadlines. It is technique for focusing management attention on danger signals which require remedial decisions, and on areas of effort for which 'trade-offs' in time, resources or technical performance might improve the capacity to meet major deadlines."

PERT was developed in 1958 through a cooperative effort of Navy Special Projects Office, Lockheed Aircraft and Booz, Allen and Hamilton, a management consulting firm, and is credited with cutting years and dollars from the Polaris Missile development program.

The basic foundation of PERT is the "network", a pictorial representation of the interdependencies and inter-relationships of the events and activities which comprise a project from the instant of its conception to the completion of the end product.

PERT is particularly useful in the successful management of highly complex, multi-level projects extending over long periods of time; it enables management not only to direct, plan, and control the physical aspects of a production job but to utilize effectively the intellectual resources involved in modern business and industrial organizations.

PERT makes its greatest contributions to the management team in those projects involving initial, first-time, nonrepetitive activities where no previous landmarks exist to direct planning or controlling of the areas involved: Research and development projects, product promotion, preparation of legal briefs, theatrical productions, college construction, curriculum development, and even the planning of a marriage -- all these are likely to lend themselves to the use of PERT. The fact that the government requires that all defense department contracts be submitted in PERT form indicates the importance of understanding the theories and practices of PERT. Similarly, U.S.O.E. funds millions of dollars' worth of federal projects almost as complex. For those concerned with the use of computers PERT is an invaluable aid; programs exist for very large as well as small computers. A tremendously involved project necessitating two or three years' lead time would naturally require a more sophisticated computer than would a simple 200-item project involving one or two persons over a period of a couple of months.

## Why Use PERT?

There are four major creiteria which indicate the necessity to use PERT:

1. The project must have a specified end objective, the accomplishment of which must be planned for within specified time limits, using certain resources. Such factors as the unusualness or uniqueness of the project, initial runs, or unknown quantities indicate use of PERT.
2. The project must have a scheduled completion time or a definite deadline to be met. If termination is indefinite and vague there is no need for tight, careful time management.
3. The complexity of the project largely determines the need for using PERT. A minimum project would involve one or two persons for about two months in the use of a "network" of 25 or 30 events. A project of over 200 events would involve using automated PERT.
4. The degree of undertainty of the definition of program elements influences the decision to use PERT; for example, initial research and development projects as against standard production type jobs.

In addition to these major considerations, the willingness of top management to implement the use of PERT by strong policy statements, by involvement of every member of the team in the use of PERT, and the adequate orientation of all users of the device to its principles is essential. PERT may be instituted by a consultant specialist or one particular member of the management team may be trained to the use of PERT -- 8 hours of lectures and practical work are a minimum instruction period.

## When to Begin Use of PERT

PERT forces good planning. Since a poor plan will result in an unworkable PERT network it is essential to begin the use of PERT as soon as a project is proposed. The initial planning, development, scheduling, testing, and recycling processes must be clearly defined at the beginning of a project. Dr. Cooke, Ohio State's PERT expert states that, "Planning a research and development project may require more time than the research work itself," and for most users of PERT that is true.

## PERT Network

The network is the diagram which visibly demonstrates the job to be done. It is the distinguishing characteristic of PERT. It portrays graphically the tasks to be accomplished and the interrelationships, interdependencies, and constraints -- time, money, or manpower - which will operate within the structure.

Usually the network will be developed from some outline of tasks to be done; the old Gantt chart, milestone chart, or activity cards will assist in making breakdown of the total package into the separate, identifiable "work packages" which will be assigned to specific persons to be completed at specific times.

Each network will begin with an "event" which will usually be numbered 1, .001, or some numerical statement that this is "begin job". It will terminate with the "end item" which signifies the completion of the job. Events, as used in PERT, are usually designated by a bubble or a box which represents a completed or started job or activity. It requires no time and no resources. The activity referred to in PERT is represented by an arrow linking two events and it represents the work done to get from one instant in time or one point which marks the beginning of an activity or its termination, to another.

Since the PERT network is designed to be viable it will grow and develop constantly during the lifetime of the project it depicts. Therefore, the master network will be drawn and redrawn many times. To begin with, after jobs to be done have been classified in some way, and given some priorities, the simple approach is to secure butcher paper or engineering fade-out vellum if available, and to begin to draw bubbles and arrows as jobs are defined. There are a number of specific rules for drawing a network. Only one line may connect any two "events". Lines may enter or proceed from any event to another but there may be no network "looping" -- that is, to connect a series of "events" or jobs and complete a "loop" or circle in so doing.

If "activity" cards are used much of the necessary information may be entered on these cards and then transferred to the network. For instance, the prior and succeeding event will be identified, the activity will be named, the three time estimates and the actual expected completion date may be entered. When the order of activities is outlined the cards may be numbered sequentially and these numbers actually allotted to the bubbles on your network. Do not worry if lines cross each other on your initial network. It will be redrawn many times. It is important to establish as soon as possible, the real logic of the planning, to settle the time and resources priorities scales and the rough outline of the sequence of activities needed to complete the job.

Once you have prepared a master network containing the basic major events necessary to complete the job it may be decided to begin to break down the master network into its sub-charts. In a large complex activity such as the establishment of a college or the production of a missile there will be many sub-charts. For instance in completing the Northern Virginia Community College network six charts were developed and many individuals further broke down their assigned tasks into additional charts. In putting a network together the events which indicate the completion of some major portion of work are identified by a special shape of bubble, or extra sided box; these are called "interfaces" and they indicate both points of completion of jobs and starts of other major activities. It seems somewhat easier to follow logic if network events are numbered sequentially, but many programs permit random numbering. This is largely personal choice. However, it is easier to detect an error or a missing event if the numbers follow each other in logical order. Though all networking flows from left to right in preparing to draw an initial network for a first time job, it is frequently desirable to begin with the "end item" and work backwards step by step to the beginning, especially if this has not been done before. This again is a matter of personal preference.

Once the work packages have been designated and each job has been allotted to a specific person, the PERT expert who will be responsible for completing the network will secure from the person who will do each particular task an estimate of the time required to do the job. If you intend to use PERT COST this is the time to make the decisions as to the rough estimates for money expenditures.

## PERT Times

One of the great benefits of PERT over many other planning devices is that it forces good planning and demands close time estimates for accomplishing jobs. For instance, in many plants when a supervisor asks a foreman for an estimate of the time needed to get his men to produce a specific job, the foreman will reason: if he allows too short a time, he will be called inefficient for not accomplishing the job; if he states exactly the amount of time he knows will be required and some unforeseen event delays this, he will be considered a poor manager. So he reasons: give an estimate heavily loaded toward a long time period to complete a job which he knows will never need that much time; then when the supervisor chops out a lump of time, as the foreman knows he will, he will still have ample time to get the job done. This is a poor way to plan and control.

On the other hand, in securing time estimates from the man who will do the job for PERT, he is asked to honestly state 1) the time he really estimates is needed to do the job; 2) a time estimate so brief that there would be perhaps one chance in a hundred of actual completion; and 3) a very pessimistic time estimate, so lengthy that there would be very little possibility of requriing that amount of time. These three time estimates are called 1) Most likely, 2) Optimistic, and 3) Pessimistic and are given symbols for use in the mathematical equations used to predict actual completion dates. They are 1) m, 2) a, and 3) b.

The PERT analyst uses the following equation to arrive at a projected time for a particular task. This is called the Expected Elapsed Time and is represented by what we call $T_e$ or "T small sub e": $\frac{a + 4m + b,}{6}$ i.e. if time estimates are 3.5.8, the expected elapsed time necessary to do that job would be $\frac{3 + 20 + 8}{6}$ or 5.1 weeks of time. This method of estimating time is almost eactly the same as using the Beta curve distribution. There are two other times which have great importance in predicting the completion dates of projects: the Earliest Expected Date symbolized $T_E$ (T sub L).

Most computer programs are designed to calculate these three kinds of times, as well as what is called the Critical Path and other limit paths throughout the network. It is entirely possible to calculate these times and paths by hand. Again, the complexity of the program will determine whether or not it can easily and within the time limits be computed by hand. There are a couple of hand-operated devices similar to simple desk calculators; one is a series of circular discs which may be manipulated to calculate these times.

Some computers produce an "audit list" which lists in proper order all jobs to be done -- all events and activities throughout the network -- and it may be used as a check list to assure the inclusion of every item in the network. Some computer reports print out data concerning Latest and EArliest Times, some show all network paths with the slack for each, others show only the Critical Path. One, called an Organization or Responsibility Report, indicates activities assigned to a particular department or unit. Others show activity variance, standard deviation, and probability statements. However, the primary necessity is for the Critical Path which must be the first to be reviewed. Incompatible dates, incomplete items, etc. are other items on some computers.

The cost of processing the network on the computer will, of course, depend upon the complexity of the program, and the kinds and amounts of information requested. Small networks can be processed on a small computer. It may be desirable to do a very small job by hand. It is not necessary to use a computer program to use PERT but when the network becomes very large the computation involved will indicate the necessity to automate the data.

Three major report forsm are:

1. The Project Outlook Report which shows the degree to which the project is running ahead or behind schedule.

2. The E-L or milestone chart which outlines the earliest and latest dates which will allow the completion of a job. A check of this report indicates the amount of slack available between two or more lines of activity.

3. The PERT Analysis Report which consists of a narrative description of the problems identified along with some suggestions for solutions. This report is usually prepared by appropriate staff personnel after studying and analyzing the data generated by hand or computer. The manager is not committed to acceptance of any suggestion involved. He will make his decision upon the basis of information he received.

Any or all of these reports may be generated weekly, bi-monthly, etc.

## $T_E$ and $T_L$ Statistical Computations and Critical Path

We have used some terms which may need explaining. Critical Path is a most vital concern of anyone working with PERT. This is the pathway through the network which will require the longest period of time to accomplish in order to complete the job on time. If there is an deviation from the time indicated for completion of events along this path the termination date for the project will be delayed. There may be more than one Critical Path through a large network. Critical Paths may change and become noncritical by the addition of money or resources. However, if manpower or other resources are removed from a noncritical path and added to the Critical Path care must be exercised that another Critical Path is created without the resources or energies to manage it.

We find the Critical Path throughout the network through a process of determining, for every event on the network, two times (in addition to the expected elapsed time for the activity): 1) the $T_E$, or the Earliest Expected Time -- this is the very earliest date at which this job may be completed and it is computed by adding to the time required to complete all prior events along the path, the time to do this particular path; in other words, all the times along the path up to the event are summed and the amount of time arrived at is the Earliest Expected Time at which that event can be completed.

2. $T_L$, or Latest Allowable Time is determined in exactly the opposite manner, for this time is the very latest date on which a specific event can be completed without delaying the completion date of the event on that path. To compute $T_L$, begin with the final, end event and subtract from it the estimated elapsed times ($T_e$'s) of all preceding events to and including that of the event in question. $T_L$ is the figure from which $T_E$ is subtracted to arrive at the slack for events along various paths. As we stated earlier, the path with the least positive or greatest negative slack is the Critical Path - the path which will require the longest period of time to complete. The computing of these times and the designation of the Critical Path can be best shown by the following diagrams and statistics.

## EXAMPLE

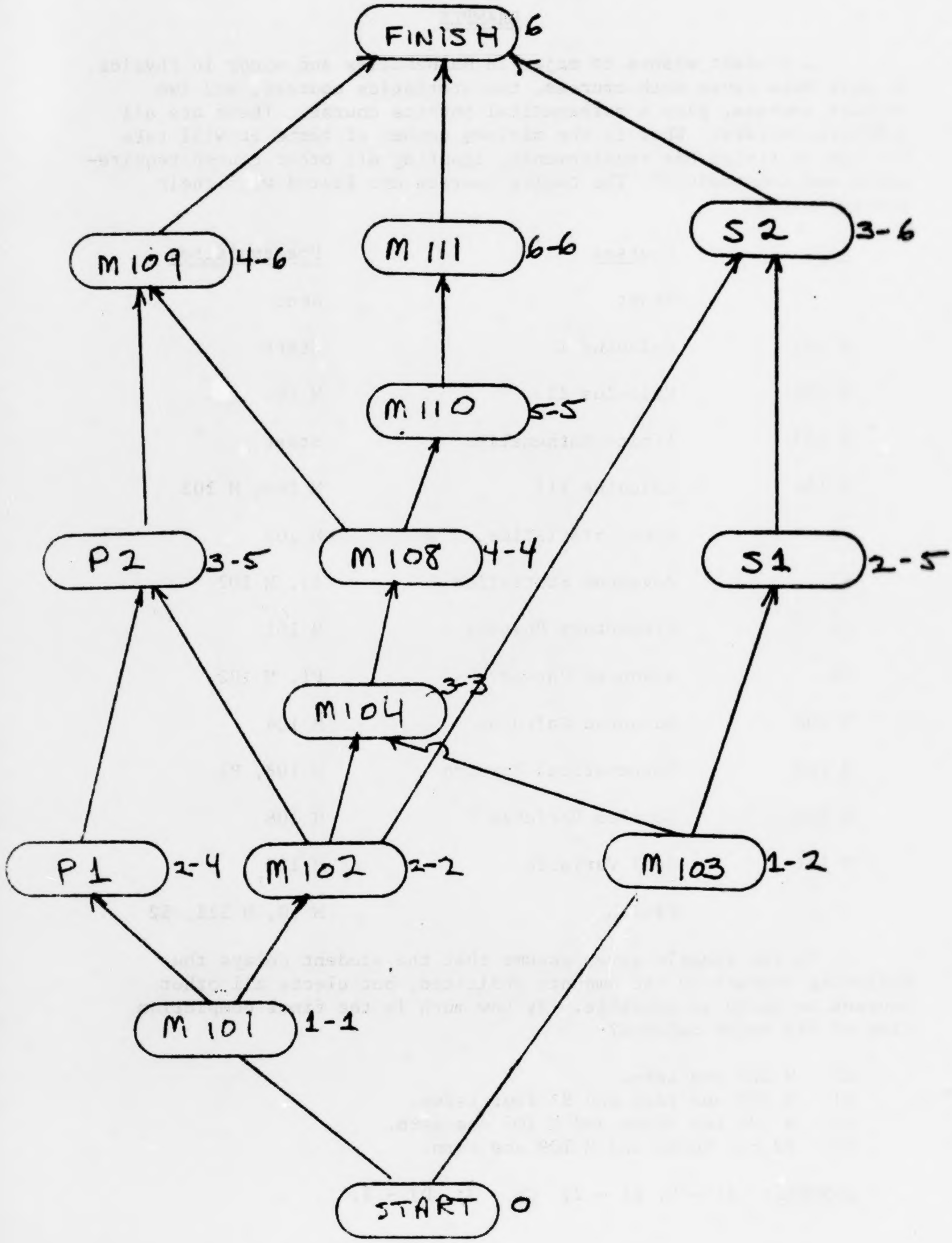
A student wishes to major in Mathematics and minor in Physics. He must take seven math courses, two statistics courses, and two physics courses, plus a mathematical physics course. These are all one-term courses. What is the minimum number of terms it will take for him to finish his requirements, ignoring all other course requirements and constraints? The twelve courses are listed with their prerequisites.

| No. | Courses | Prerequisites |
|---|---|---|
| . | Start | None |
| M 101 | Calculus I | Start |
| M 102 | Calculus II | M 101 |
| M 103 | Finite Mathematics | Start |
| M 104 | Calculus III | M 102, M 103 |
| S1 | Elem. Statistics | M 103 |
| S2 | Advanced Statistics | S1, M 102 |
| P1 | Elementary Physics | M 101 |
| P2 | Advanced Physics | P1, M 102 |
| M 108 | Advanced Calculus | M 104 |
| M 109 | Mathematical Physics | M 108, P2 |
| M 110 | Complex Variable | M 108 |
| M 111 | Real Variable | M 110 |
|  | Finish | M 10, M 111, S2 |

In the example given assume that the student delays the following courses by the amounts indicated, but elects all other courses as early as possible. By how much is the final completion time of his major delayed?

A) M 103 one term.
B) M 103 one term and S1 four terms.
C) M 101 two terms and M 108 one term.
D) P2 two terms and M 109 one term.

ANSWERS: A) - 0; B) - 2; C) - 3; D) - 1.


FINISH 6
M109 4-6
M111 6-6
S2 3-6
M110 5-5
P2 3-5
M108 4-4
S1 2-5
M104 3-3
P1 2-4
M102 2-2
M103 1-2
M101 1-1
START 0

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*Also available through ERIC Clearinghouse, Vocational and Technical Education, Ohio State University, Columbus, Ohio 43212

## PLANNING AID

PLANALOG, a planning system available from Planalog, Inc., 833 Suburban Station Building, Philadelphia, Pennsylvania 19103.

# APPENDIX B

# REPORTS OF TASK FORCE GROUPS

# INSTITUTE - PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

Group I Organizational Structure for Systematic Facility and Equipment Planning

Chairman - Daniel E. Koble, Jr.
State Director of Vocational Education
Deleware State Dept. of Public Education
Dover, Delaware 19901

Secretary - John E. Frazier, Program Specialist
Business and Distributive Education
Knott Building
Tallahassee, Florida 32304

Committee Members - See list of participants

The several states represented on this discussion group handle facility planning differently. The differences vary from slight to major.

The relationship of vocational-technical facility panning consultants to general educational facility planning consultant varies from state to state.

The group divided into three small groups to enable us to focus on several problems that had to be taken into consideration before a specific structure could be accepted by the group.

I. Group A -- Where do we start with planning a construction program? Do we need new facilities or are we adding to the existing ones? Where do we begin?

   A. People and their awareness of education needs

      1. Identification and classification of educational needs

         a. Studies (involvement, common needs, check state laws)

b. Get state office support
c. Develop PERT
d. Develop advisory commissions
e. Reports and recommendations
f. Develop guide-lines
g. Approval of study recommendations and guide-lines
h. Program approval

B. Implementation

a. Community (region) support
b. Millage vote (local)
c. State and federal support (sell bonds)
d. Educational specifications
e. Hire architects
f. Visitations to other programs
g. Site selection and purchase
h. Advertise bids
i. Let bids
j. Construction
k. Supervision
l. Program operation

C. Measurement and evaluation

a. State
b. Local
c. Federal
d. Business and industry
e. People
f. etc.

II. Group B -- What is the role of the state staff in planning vocational-technical facilities?

A. Flow Chart

1. Local Advisory Committee

a. Industry
b. Labor management
c. Students
d. Community activities
e. Chamber of Commerce
f. Higher education
g. School commission
h. Mayor
i. Parents
j. Department of Education
k. Teacher

III. Group C -- How do we organize to best provide for: Planning long range and immediate needs; Financing; Construction; City, rural, disadvantaged, and handicapped needs?

A. Selection of Ad Hoc Committee

1. Membership

a. Business-management
b. Employment Security Commission
c. Education
d. Parents
e. Labor including unions
f. Sociologist
g. Psychologist
h. Architect

B. Determine Immediate Needs and Plans

1. Occupational Survey

2. Potential Student Survey

a. College transfer
b. Non-credit adult
c. Two-year vocational-technical
d. Associate degree
e. Adult education
f. Community service

3. Programs and anticipated enrollments

4. Building and equipment needs

5. Financing options

C. Determining long range needs and plans

1. Future financing

2. Future growth (construction)

3. Future community growth, changes in total population, industrial changes, etc.

Steps in the development of a comprehensive community junior college

1. Local group gets interested and requests consideration of project by the state board

2. Investigation by state board staff concerning

    a. Appropriateness of size and make-up of district
    b. Potential student body
    c. Occupational needs of the area
    d. Location of proposed college in light of State Master Plan
    e. Ability of district to finance capital outlay and operation
    f. Potential growth of area
    g. Availability of suitable site (size, transportation)
    h. Other educational service of similar nature available in the area
    i. Prospect of institution developing

3. Local group takes action toward meeting legal requirements for administrative organization pattern, financial requirements, etc.

4. Appointment of Board of Trustees of the community college

5. Appropriation of funds needed for inauguration of project

6. Selection and appointment of president and key assistants

7. Appointment of advisory committees - general committee and specific curriculum committees

8. Study of community occupational needs and potential student body in terms of specific curriculum proposals

9. Determination of curriculum offerings and size of school

10. Developing the curriculums and courses within curriculums

11. Developing equipment lists needed to teach the courses chosen

12. Developing equipment specifications. Send out bid sheets for bids on equipment

13. Determining space allocations required to house the equipment and meet classroom and other needs of the institution

14. Selecting the architect

15. Selecting the site for the college

16. Preparing plans and specifications

17. Taking bids on contract

18. Letting the building contract

19. Planning and setting into motion the public relations and student recruitment plans

20. Hiring the faculty and other personnel

## INSTITUTE - PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

### Group II - Codes, Standards and Specifications for Facilities and Equipment

Chairman - Lon R. Shell
Agricultural Mechanics Instructor
East Texas State University
Commerce, Texas

Secretary- Anthony A. Pisciotta
Assistant Supervisor T & I Section
State Board for Community Colleges and
Occupational Education
207 State Services Building
Denver, Colorado 80203

Committee Members - See list of participants

A person with the responsibility for planning a new institution for comprehensive vocational education programs will be vitally interested in codes, standards, and specifications for facilities and equipment. The topic will be an integral part of the total planning process; there are special problems that a facilities planner must recognize regarding the topic; the relationship to educational effectiveness of the institution will be reflected in the cost, public acceptance, and the image of vocational education by the standards and specifications incorporated in the facilities and equipment.

It was the concensus that every jurisdiction will be governed by a different code requirement depending on the code adopted in the various geographic area. The standards and specifications should be relatively uniform throughout the country but may vary to fit local conditions. Standards and specifications of facilities and equipment should not be restrictive to the degree that they stereotype or prevent innovative planning or design.

Codes, standards and specifications do not stand apart from comprehensive planning. The planner should not write specifications for a facility without an understanding of the trends and objectives of the overall program.

Some of the elements that should be included in a planning guide are:

1. Space allocations
2. Utilities
3. Total environmental conditions
4. Acoustics
5. Relationship of equipment placement to student stations
6. Structural consideration that might be needed to accomplish the objective (for instance, a door large enough to admit an automobile in an auto mechanics shop; windows that would not take up wall space that may be needed for tool panels)

The committee agreed that a state should establish a guide for planners of vocational facilities. It was also the concensus that there should be a national check list, guideline or exemplars, to be used for reference.

There are special problems that a facilities planner should recognize relative to standards, specifications and codes. There may be budgetary limitations but this should not stagnate nor prevent innovative and imaginary planning. He should plan for the ultimate and if necessary, he may have to sub-optimize.

The planner should provide for training stations that emulate industry as near as possible but caution should be exercised to not overextend. Some of the stigma that has been attached to vocational education in the past may be alleviated by considering aesthetic values in facilities design and site location.

The committee felt it would be helpful to a planner if an annotated bibliography on facilities and equipment for occupational education was made available to state and local agencies. In addition, the committee recommended that a list of outstanding facilities and their location be compiled and distributed.

In summary, codes, standards, and specifications represent a point in time relative to the total planning process; consequently, the planner should always keep uppermost in his mind the needs of the students and special emphasis should be directed to the welfare of the handicapped and disadvantaged throughout the planning process. By taking into consideration the suggestions in this report, it is our opinion that those responsible for developing occupational education programs can more nearly achieve relevancy in planning a facility.

# INSTITUTE - PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

## Group III - Planning for Physically Handicapped and Other Special Needs

| | |
|---|---|
| Chairman | Bill E. Lovelace<br>Instructional Program Director<br>Texas Education Agency<br>Austin, Texas 78711 |
| Secretary | Charles J. Poskanzer<br>Associate in Education Plant Planning<br>New York State Education Department<br>Albany, New York 12224 |
| Assistant Secretary | Louise Egan<br>Education Consultant, Nursing Programs<br>Florida Department of Education<br>Tallahassee, Florida 32301 |
| Committee Members | See list of participants |

Mr. Chairman and fellow educators, we, the group responsible for discussing the topic "Planning for Physically Handicapped and other Special Needs", offer this pertinent though short report.

It is our considered opinion that, in the time allotted, no clearcut plan for facilities for the aforementioned groups of students could be developed. The overriding concensus of opinions was, however, that:

> Whereas; these individuals have not been adequately considered in previous schoolhouse planning, and whereas; the "1968 Amendments to the Vocational Education Acts of 1963" mandate that we, the professionals must aid in the education of the handicapped individuals.

We, the committee, charge all parties involved in the planning of educational facilities with the responsibility of prime consideration for the needs of the "total spectrum" of handicapped students, and that this be done in the immediate future, since time is of the essence.

The activity of Group III centered about discussions of how much, and how little, activity was being carried out in the various represented states. Anecdotes, offered by the members, have shown that, some states are involved in program innovations, but that very little if any is being done to plan for the housing of these programs.

One such program currently being implemented in the Cincinnati Public Schools in cooperation with the Ohio Department of Vocational Education and the Ohio State Bureau of Vocational Rehabilitation utilizes the concept of blending the services of these two agencies. This program, carried out in a "center" focuses on serving youth who are malajusted to education and whose handicaps prevent them from succeeding in traditional classrooms and programs which might prepare them for a job. This "center" reflects the educational specifications preparation for "A Vocational Rehabilitation and Job Preparation Center".

Another program, which impress our group, is one in operation in Washington, D. C. Mrs. Bolden is able to speak of its obvious merits.

The representative from Vermont presented floor plans of a proposed vocational special education (E.M.R.) facility for our examination and reaction. The proposed building is to be an addition to an existing area-center plant, and is designed to include a classroom, shop, and seminar area.

The discussions have led us to conclude that, although programs are being considered, greater emphasis must be place on the planning for the facilities which will more adequately reflect

(a) The programs to be conducted

(b) The activities to be performed

(c) The ancillary services to be provided, as well as the physical characteristics of the students concerned

Be it known that, this is no "great chore", but that we, the educators, must provide the leadership, and we must do it now.

## INSTITUTE - PLANNING FACILITIES AND
## EQUIPMENT FOR COMPREHENSIVE
## VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

### Group IV - The Role of the Architect and the Specialist in Planning Facilities and Equipment

Chairman - William Knife
Bureau of School Planning
Department of Education
Sacramento, California 95814

Secretary - Wilfred M. Bates
Director, Occupational Education
Western Kentucky University
Bowling Green, Kentucky 42101

Committee Members - See list of participants

The committee concurred that planning for school construction should be on on-going process. At the time that a school district realizes it must enter into physically constructing a building, it should appoint a pre-planning committee with the charge to determine the types of programs needed within the new building to meet the established philosophy and objectives of the school district. At the same time, the school district should engage a planning specialist whose role would be to serve as an adviser to the building committee and as a consultant to the school district in those areas where expertise in facility planning is needed but not available within the building committee or local staff.

Upon completion of the pre-planning committee's determination of the types of programs needed and completion of the analysis of existing conditions by the planning specialist, the school district should engage an architect who shall become an adviser to an appointed school building committee. The role of the architect would be to:

1. Prepare schematic solutions to the educational specifications
    - a. Space relationships
    - b. Flow diagram
    - c. Site studies

2. Submit schematic solutions to the education specifications committee for its reaction

3. Make revisions and secure the building committee's approval

4. Prepare schematic solution for board approval

5. Prepare preliminary design

    a. Site plan
    b. Floor plans
    c. Elevations
    d. Sections
    e. Equipment layouts
    f. Prospectives and/or models
    g. Outline of construction, materials, and equipment
    h. Preliminary cost budget

6. Secure building committee's approval

7. Secure board approval

8. Secure state and local agency approval

9. Prepare working drawings and construction specifications which include equipment specifications and final cost estimate

10. Secure final approval of building committee

11. Secure board approval

12. Secure state and local agency approval

13. Assist in obtaining construction bids

14. Review and recommend award of construction contracts

15. Secure board's approval of construction contracts prior to start of construction

16. Supervise construction

17. Secure state and local agency final approval of building

18. Turn facility over to board

19. Assist school district in utilization of facility

In conclusion, two key persons who must be involved in the building program are the planning specialist and the architect if maximum efficiency and utilization of the facilities are to be achieved.

# INSTITUTE - PLANNING FACILITIES AND
# EQUIPMENT FOR COMPREHENSIVE
# VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

## Group V - Site Selection and Development

Chairman - Alfred E. Davies
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New York State Education Department
Albany, New York 12224

Secretary - William R. Burton
Superintendent of Schools
Lorain County Joint Vocational School District
Oberlin, Ohio 44074

Committee Members - See list of participants

The school site is more than a setting for a building. At its best, it is an integral part of the total educational complex.

The successful operation of the school plant depends in great measure upon the well planned acquisition, development, and utilization of the site for the school building.

Site selection and development should proceed from the basic premise that the school is an integral and inseparable part of the total community culture.

### I. Criteria for Site Selection and Development

A. Present and Future Environment

1. Nature of present surroundings

    a. Freedom from distractions, hazards
    ex: stay clear of airport runways
    b. Consider present zoning regulations in area
    c. Good visual aspect, have building in an area that can be seen, not isolated

B. Integration with Community Planning

  1. Acceptability in the complete community plans
  2. Value for extensive community use
  3. Socio-economic status of community
  4. Attractiveness to students - pride in school

C. Size of Site

  1. Conformity to present and future educational programs

     a. Enough land now for present program
     b. Added land space for future expansion

D. Accessibility

  1. Accessibility for general public
  2. Consider travel distances of students
  3. Located on state routes for easy access

E. Site Characteristics

  1. Complete soil test borings - sub-soil conditions
  2. Esthetic value of site
  3. Land characteristics usable to educational advantage
  4. Adequate drainage
  5. Complete topography survey, shape of land
  6. Suitability for type of program

F. Services

  1. Closeness to utility connections

     a. Water
     b. Sewage
     c. Gas
     d. Electric
     e. Fire and police protection

G. Cost of Land

  1. Site preparation, movement of earth
  2. Drainage at reasonable cost
  3. Cost of utility connections

II. Relationship of Site to Total Planning

A. A complete survey should be conducted to determine the needs of occupational education

B. Program for community and student needs

- C. Committees formed: local people, staff, business and industry, consultants, students, to help determine educational specialties
- D. Public acceptance of program (voting)
- E. Choice of site (always after the election)
- F. Preparation of plans and specs by architect
- G. Financing: Bond sale, advertisement for bids, award contract
- H. Construction
- I. Students in - open house

III. This committee felt that a state planning guide would be useful. It appears that a national guide would not be workable.

IV. This item is covered under Item H. above.

V. The committee felt that the site selection and development has an important relationship to educational effectiveness to the total vocational education program

VI. Other individuals that can be helpful in the site selection process

- A. Work with Chamber of Commerce, reviewing business and population trends
- B. Research co-ordinating unit
- C. Planning commissions
- D. Regional commissions
- E. Federal and state highway plans
- F. H. E. W.
- G. O. E. O.
- H. Geological survey
- I. Take early options on several sites
- J. Survey of employment opportunities
- K. Consider the future needs of land

L. Evaluate possible sites using a rating scale

M. Review various sites with architect with consideration of programs

VII. Sources of Information

A. California's Bulletin on Site, State Department of Education

B. "Site Analysis", Onodaga, New York

C. "School Sites, Selection, Development and Utilization", 1958. H.E.W., Washington, D. C.

D. "Basic Planning Guide for Vocational Education and Technical Education Facilities", 1965, H.W.W., Washington, D. C.

E. The following from the "American Institute of Architects", 1735 New York Avenue, NW, Washington, D.C., 10¢ each

1. BT-58 "Site Selection and Utilization

2. BT-45 "Budget for School Site"

3. BT-21 "Environment and Education"

F. "Schools for America", AASA, 1967 Report, 1201 Sixteenth Street, NW, Washington, D. C.

## INSTITUTE - PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

Group VI - Development of the Educational Specifications for Facilities and Equipment

Chairman - David W. Hutcheson
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University of Nebraska
Lincoln, Nebraska 68508

Secretary - Burneil E. Gingery
Administrative Director - Agricultural Education
State Department of Education
Lincoln, Nebraska 68509

Committee Members - See list of participants

Phase I Demographic

A. Basic Philosophy

1. Who will be served
2. How will it serve the community

B. Data Complication

1. Survey

   a. Local
   b. State
   c. National

2. Census

   a. Projected growth
   b. Present population

C. Needs of the Community

- 1. Industrial growth region
- 2. Types of industries
- 3. Employment needs

Phase II Economy - Total Educational Program: Decision who will be Responsible for the Program

A. Study of Needs

- 1. Involvement of community
    - a. Business and industry
    - b. Labor - professional personnel
    - c. Students service organization
- 2. Determine behavioral objectives
    - a. What students need to know
    - b. What will they be doing after graduation
    - c. What competencies are needed

B. Curriculum Development

- 1. Teacher involvement
- 2. Advisory committee

Phase III Methodology

A. How will course be taught

- 1. Single teacher
- 2. Two teachers
- 3. Teacher aids

B. Related vs. laboratory

C. Classroom - cooperation

D. Full-time - part-time

E. High school - post high school, adult

Phase IV Development of Education Specs

A. Early involvement by architect

B. Use of all resource people - material

C. Detail (leave no margin for error)

1. Not a specific floor plan
2. Give approximate footage
3. Include lighting, electrical air movement type of furnishings and fixtures

D. Need for a constant dialogue

E. Need to have specification sheets

F. Need for time in development and a chance to change some education specs.

# INSTITUTE - PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

## Group VII - Media and Equipment for Occupational Education

Chairman - Ivan E. Lee
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College of Education, University of Nevada
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Secretary - Ted Ivarie, Associate Professor
Head, Department of Business Education
Utah State University
Logan, Utah 84321

Committee Members - See lists of participants

Considerably more emphasis must be given to the planning process as it relates to the development of educational specifications. Provision for subject-matter expertise should come prior to considering:

1. Curriculum
2. Instructional strategies
3. Equipment and media
4. Facility design

Financial resources available at the planning stage may preclude hiring key staff members or expensive consultants. One suggested alternative is to contract with appropriate individuals in convenient geographic proximity on a part-time basis.

Emerging practices that focus upon providing flexible, individually designed educational programs for students include:

1. Assessing student capabilities and existing levels of knowledge related to specific subjects for approrpiate placement

2. Modifying schedules to meet a variety of student needs

3. Establishing academic requirements based on amount of knowledge acquired rather than time spent in class so students can proceed through a subject at a pace consistent with individual capabilities

4. Providing a variety of enrichment and remedial learning experiences

5. Using a multi-media approach to learning

6. Implementing a differentiated approach to staffing

The above practices or objectives imply a physical facility that is capable of accommodating large group, small group (including laboratory), and individual study activities.

Instructional media for which provision should be made in a building include:

1. Television

2. Projectors, such as overhead, opaque, filmstrip, 16mm movie, 35 mm slide

3. Audio, such as record players, tape recorders, multiple channel listening laboratories

4. Programmed instruction, including computer-based and non-computer based

Specific considerations to be included are:

1. Television mounts for wall or ceiling suspension

2. Rheostat controls at door and more importantly at teacher station for light control

3. Projection screens installed on track for movement to different positions

4. Rear projection screens should be built in for use in large group instruction areas

5. Study carrells should be available for individual study

6. Storage areas for video tapes, films, audio tapes, programmed instruction materials

7. Space for dial access retrieval systems

8. Adequate crawl space for modifying electrical, air lighting, and water services

A request was made for dissemination of curriculum and equipment guidelines and software that might be avilable for a multi-media approach to learning.

Position Statement

Equipment representative of that found in industry should be provided to meet behavioral objectives specified. "Hands on" experience should still be given priority consideration as compared to working with models.

One suggestion for overcoming some cost factors in equipping facilities may be utilization of state-operated equipment pools or leasing arrangements.

### INSTITUTE - PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

Colorado State University
Fort Collins, Colorado

October 27 - 31, 1969

## Group VIII - Innovations and Emerging Concepts in Planning Facilities

Chairman - Ray D. Purkey, Assistant Director
Vocational Education
Division of Vocational Education
State Department of Education
Columbus, Ohio 43215

Secretary - Clifton H. Matz
Assistant Dean for Career Programs
Parkland college
Champaign, Illinois 61820

Committee Members - See list of participants

Tackling this topic was like trying to open a Chinese puzzle box -- a box without a key, a box for which one has to solve the locking method.

Vocational education has, until the Vocational Education Acts of 1963 met its commissioned commitment to a reasonable degree. Today vocational education is hardly in contact with the target population. Occupational education must rise from an interior, unfortunate position to one of more than reasonable success.

The objective has changed from a vocational program which

1. Prepares youth for specific jobs
2. Trains adults for employment
3. Retrains
4. Updates and upgrades

to occupationsl programs which provide instructional curricula of two years of post-high school level or less which must meet the needs of the community. These programs are offered by comprehensive high schools, area secondary schools, area post-secondary schools, comprehensive community junior colleges, and technical institutes to provide meaningful programs to qualify individuals for entrance employment and to provide instruction for retraining, upgrading, and updating through continuing education.

Occupational education is at that time and place where we must take heed of the Greek philosopher, Heraclitus statement, "Man is on earth as an egg, he must either hatch or rot."

Before it is possible to determine innovative and emerging concepts in facility planning it is necessary to establish the instructional concepts which will be applied. A listing of the concepts discussed were:

1. Student-centered instruction
2. Clustering of instructional content which would include the unilateral involvement of staff
3. Clustering of compatible laboratories
4. The integration of occupational and academic instruction
5. Separation of lecture and laboratory instruction
6. Non-scheduled open laboratories
7. Non-graded classes by which the student does not receive a grade until a passing grade is earned
8. Continuous registration
9. Competency moduling, which would provide for individual differences
10. Expanded cooperative offerings with greater coordination between labor and industry.
11. The scheduling of larger classes, which should instigate different methods of teaching and use of equipment
12. Flexible scheduling, which will bring about adjustments in the clock hour concept
13. Extended day to utilize facilities more hours per day
14. Multiple staffing
15. Faculty mix when assigning offices
16. Clustering of faculty offices around the student center
17. Audio-tutorial system
18. Use of simulated mock-ups or models
19. Use of components for instruction rather than complete pieces of equipment

Innovation should not be just for innovations sake but must

1. Be based on established objectives
2. Provide for improved learning
3. Provide the maximum instructional space at a minimum cost
4. Provide for the optimum instructional methods at a justifiable cost
5. Reference to state guidelines in states where required. Guidelines are a definite aid to some. Others find them restricting.

The implementation of innovative instructional concepts should involve the application to some degree the following emerging concepts in facility planning:

I. Instructional Related

   A. Open space application in instructional, laboratory and student services

   B. Designing classrooms and laboratories without windows

   C. Limit ceiling heights to usable dimension

   D. The use of appropriate flooring (carpeted where applicable)

   E. Clustering of compatible laboratories

   F. Instructor office space with central preparation

   G. Area use of carpeting and a "curtain rod" set-up for temporary partitions

   H. Provide for emerging electrical instructional concepts such as closed circuit T.V., computer based learning and/or instruction and dial access

   I. Core storage

   J. Comport control

   K. Instructional resource center (IRC)

II. Types of Facilities

   A. Rented

   B. Mobile laboratories

   C. Inflated building, when using large equipment for instruction or for short term laboratory use or demonstration

   D. Esthetic effect

   E. Open exterior halls

   F. Flexible halls - for multi-use such as study corrals

   G. Operational and maintenance factors must be given more study

   H. Flexible services (Electronic carpet)

I. Pre-fab structures

J. Shopping-plaza approach integrated with business and industry

K. Landscaping

L. Off-site modular construction

III. Student Personnel Services

A. Guidance suite

B. Student commons

C. Cafeteria

D. Provide space for related services such as: non-student counseling, Bureau of Employment services, vocational rehabilitation, medical rehabilitation and other referral agencies

The degree of application is not indicated. The methods of implementation is up to the administration and staff and the involved community.

We are working with the most critical and valuable of all our nations resources -- human resources. It is paramount that personal interests and vested interests become secondary and all shoulders are put to the same side of the problem and work as a team.

# APPENDIX C

# PROGRAM, PARTICIPANTS, AND FACULTY

# PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

## PROGRAM

October 27 - 31, 1969

Sponsored by the

Department of Vocational Education
Colorado State University
Fort Collins, Colorado

Institute Director - - Dr. Milton E. Larson

Institute Co-Director- Dr. Duane L. Blake

This institute is supported by a grant from
the Office of Education of the
Department of Health, Education and Welfare

## PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

REGISTRATION: Newsom Hall (Lobby) Sunday, October 26, 1 - 7 p.m.

RECEPTION: Newsom Hall (Lobby) Sunday, October 26, 8 - 9 p.m.

GENERAL CHAIRMAN: Dr. Milton E. Larson

Monday - October 27

| | | | |
|---|---|---|---|
| 8:00 a.m. | OPENING | ROOM 228 | -- STUDENT CENTER BUILDING |
| | Welcome | | -- Dr. Duane L. Blake, Chairman, Department of Vocational Education |
| | Greetings | | -- Dr. Charles O. Neidt Academic Vice President Colorado State University |
| | Announcements | | -- Dr. Milton E. Larson |
| 8:30 | THE CHALLENGE - BETTER PLANNING | | -- Mr. Michael Russo, Chief of the Planning & Evaluation Branch U. S. Office of Ed. |
| 9:30 | Coffee Break | ROOM 230 | |
| 10:00 | TRENDS AND NEW DIRECTIONS IN PLANNING FACILITIES WITH IMPLICATIONS OF THE 1968 ACT | | -- Mr. Michael Russo |
| 11:30 | Lunch | | |
| 1:00 p.m. | LEADERSHIP IN FACILITIES PLANNING | | -- Dr. Walter Arnold President, American Vocational Research Corp. Washington, D.C. |
| 2:30 | Coffee Break | ROOM 230 | |
| 3:00 | WORKSHOP SESSIONS | | |

| GROUP | I | II | III | IV | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|---|
| ROOM | 208 | 210 | 212 | 220 | 224 | 226 | 222 | 228 |

(The same group will occupy the same room for later sessions)

Monday - October 27

| | | |
|---|---|---|
| 7:00 p.m. | IMPLICATIONS OF CHANGE FOR CURRICULUM AND FACILITIES PLANNING | -- Dr. William Chase<br>Facilities Development Section<br>U. S. Office of Ed. |

Tuesday
October 28

| | | |
|---|---|---|
| 8:00 a.m. | SURVEY TECHNIQUES AND NEED STUDIES | -- Dr. Wallace Strevell<br>Professor of Education<br>University of Houston |
| 9:30 | Coffee Break | -- Room 230 |
| 10:00 | PLANNING THE EDUCATIONAL SPECIFICATIONS - MASTER PLANNING | - Dr. Wallace Strevell |
| 11:30 | Lunch | |
| 12:30 p.m. | EDUCATIONAL SPECIFICATIONS: WHAT THEY ARE, VALUE, WHAT THEY INCLUDE, WHO DEVELOPS THEM, ETC. | -- Dr. William Chase |
| 2:00 | DEPARTURE - FIELD STUDY OF UNITED AIR LINES TRAINING CENTER AND BOULDER VOCATIONAL-TECHNICAL CENTER | |

Wednesday - October 29

| | | |
|---|---|---|
| 8:00 a.m. | BASIC PLANNING CONSIDERATIONS: SITE, BUILDING, SPACE RELATIONSHIPS | -- Dr. James P. MacConnell<br>Director, School Planning Laboratory<br>Stanford University |
| 9:30 | Coffee Break | -- Room 230 |
| 10:00 | PLANNING FOR THE TOTAL SPECTRUM OF NEEDS; STUDENTS, FACULTY, OTHERS | -- Dr. James P. MacConnell |
| 11:30 | Lunch | |
| 1:00 p.m. | PLANNING SHOPS AND LABORATORIES | -- Dr. George Mehallis<br>Director of Technical, Vocational and Semiprofessional Studies - Miami-Dade Junior College |
| 2:30 | Coffee Break | -- Room 228 |

Wednesday - October 29

| | | |
|---|---|---|
| 3:00 p.m. | WORKSHOP SESSIONS | -- Room Assignments as on Page 2 |
| 7:00 p.m. | SELECTION OF EQUIPMENT | -- Dr. George Mehallis |
| 8:30 p.m. | SURPLUS FEDERAL EQUIPMENT | -- Dr. George C. Decker<br>Surplus Property Utilization Officer, U. S. Office of Education, Field Services<br>AND<br>Clayton S. Brown<br>Regional Representative of Surplus Property<br>Denver, Colorado |

Thursday - October 30

| | | |
|---|---|---|
| 8:00 a.m. | PLANNING AUXILIARY AND OTHER SPACES | -- Dr. Richard Meckley<br>Kanawha Valley Graduate Center,<br>West Virginia University |
| 9:30 | Coffee Break | -- Room 230 |
| 10:00 | SIMULATION TECHNIQUES IN PLANNING VOCATIONAL-TECHNICAL FACILITIES | -- Dr. Richard Meckley |
| 11:30 | Lunch | |
| 1:00 p.m. | THE PLANNING AND CONSTRUCTION OF GREEN RIVER COMMUNITY COLLEGE | -- Dr. Ray Needham |
| 1:45 p.m. | THE PLANNING AND CONSTRUCTION OF SOUTHERN NEVADA VOCATIONAL-TECHNICAL CENTER | -- Mr. Clayton Farnsworth<br>Director, Southern Nevada Vocational-Technical Center |
| 2:30 | Coffee Break | -- Room 230 |
| 3:00 | WORKSHOP SESSIONS | -- Room assignments as on page 2 |
| 6:00 | Banquet (West Ballroom) | -- Dr. Duane L. Blake |
| | Toastmaster | -- Dr. C. W. Hotchkiss, Dean |
| | Remarks | Summer Session and Special Programs |
| | BUILDING FOR THE FUTURE | -- Dr. Joseph T. Nerden,<br>Professor of Vocational Education<br>North Carolina State Univ. |

## Friday - October 31

| | | |
|---|---|---|
| 8:00 a.m. | CONSTRUCTION COSTS AND FINANCING METHODS | -- Dr. Joseph T. Nerden |
| 9:30 | Coffee Break | -- Room 230 |
| 10:00 | APPLICATIONS OF THE "PERT" PROCESS OF FACILITIES PLANNING | -- Mr. Robert L. McKee<br>Director, Washington AMIDS<br>Washington Technical Institute |
| 11:30 | Lunch | |
| 1:00 p.m. | CYBERNETIC LEARNING SYSTEMS | -- Mr. Julius Oleinick<br>President<br>Computer Graphics Inc. |
| 2:30 | Coffee Break | -- Room 230 |
| 3:00 | WORKSHOP TASK FORCE REPORTS | -- Secretaries of task force groups<br>(Each will have 10 minutes for the report) |
| 4:20 | EVALUATION<br>BUILDING THE MULTIPLIER | -- Dr. Larson and staff |

## INSTITUTE ON PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

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October 27-31, 1969

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# APPENDIX D

# ILLUSTRATIONS OF PLANNING PROCEDURES USED

## TENTATIVE PROGRAM

## PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

(October 27 to 31, 1969)
Maximum Number of Participants - 100

|  | 8:00 - 9:30 a.m. | 10:00 - 11:30 a.m. | 1:00 - 2:30 p.m. |
|---|---|---|---|
| MON. | Registration, welcome introductions, announcements<br>The Challenge - better planning for the future | Trends and new directions in planning facilities and equipment for comprehensive vocational education programs | The role of the vocational educator in planning facilities |
| TUES. | Need studies and master planning | Planning for the total spectrume of student need including disadvantaged and physically handicapped | Basic planning considerations:<br>Site<br>Building |
| WED. | Planning shops and laboratories | Planning other instructional and auxiliary spaces | Remodeling existing facilities |
| THURS. | Equipment selection | Media and "technologies of education" | Educational specifications |
| FRI. | Factors affecting costs | Funds and financing - or - "Pert" process | Task force reports from each of the eight task force secretaries |

TENTATIVE PROGRAM, Continued

| | 3:00 - 4::30 p.m. | Evening activities |
|---|---|---|
| MON. | WORKSHOP SESSIONS<br>- Eight task forces of 1- 15 each<br>- Each task force to concentrate on one of eight topice identified below | Campus and community tour together with outing |
| TUES. | - Each task force to meet at this time Monday through Thursday and report on Friday | Film showing |
| WED. | - Report to become a part of the final report | Task forces meeting in group sessions |
| THURS. | | Banquet and award of certificates |
| FRI. | Building the multiplier effect; summary and evaluation | |

TASK FORCE SUBJECTS FOR DISCUSSION, RESEARCH AND REPORTING:

1. Organizational structure for systematic facility and equipment planning
2. Codes, standards, and specifications for facilities and equipment
3. Planning for physically handicapped and other special needs
4. Role of architect and specialists in planning facilities and equipment
5. Site selection and development
6. Development of the educational specifications for facilities and equipment

## APPLICATION

## INSTITUTE ON PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE

COLORADO STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION

FORT COLLINS
COLORADO

1. Name of Applicant: Mr.
Mrs.
Miss ______________________________
(Last) (First) (Middle

2. Home Address:

Street ______________________ City ______________________

State ______________ Zip Code __________ Telephone Number _____

4. Name of Institution Where You are Presently employed: ______________________

5. Institution Classifications: (Check)
( ) State Department or State Board for Voca;tional Education
( ) University or College (4 year)
( ) Other ______________________

6. Business Address:

Street ______________________ City ______________________

State ______________ Zip Code __________ Telephone Number _____

7. Title of Present Position: ______________________

8. Classification of Present Position:
( ) State Director
( ) State Supervisor
( ) Vocational Teacher Educator
( ) Other (specify): ______________________

9. Professional Education Employment Record. List experiences in the field of education. (List most recent experience first and give the last four positions only).

| Position | Institution | City | State | No. of Years |
|---|---|---|---|---|
| | | | | |
| | | | | |
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10. Non-educational Employment Record. List experiences in business, industry, government, Military Service, etc. (list most recent experience first.)

| Position | Institution | City | State | No. of Years |
|---|---|---|---|---|
| | | | | |
| | | | | |
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11. Formal Education. Include Ph.D., Masters, Bachelors, and Associate degrees.

| Institution | Degree | Year Received | Major Field |
|---|---|---|---|
| | | | |
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| | | | |
| | | | |

12. Briefly indicate why you are interested in this institute and anticipated value of this institute for your present position.

13. If selected would you be able to be in attendance during the full period of the institute? ( ) Yes ( ) No ( ) Uncertain

14. If selected would you desire to take this institute for credit? ( ) Yes, graduate credit ( ) Yes, undergraduate credit ( ) No, credit not desired. NOTE: 3 credits are available upon completion of additional written work, which must be completed and returned by December 1, 1969.

15. If selected would you plan to travel to the institute mainly by: ( ) Air ( ) Private care ( ) Other (Specify)________________

16. If selected would you most likely; ( ) Come alone ( ) Accompanied by family, wife and ____ number of children.

NOTE: Family accommodations are available upon request.

17. Date ____________ Applcant's Signature________________________

Return to:
Dr. Milton E. Larson, Director
Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

RETURN TO:

Dr. Milton E. Larson, Professor of Vocational Education,
and Director, Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

## ACCEPTANCE OF INSTITUTE INVITATION

I accept the invitation to attend the INSTITUTE ON PLANNING FACILITIES AND EQUIPMENT FOR COMPREHENSIVE VOCATIONAL EDUCATION PROGRAMS FOR THE FUTURE to be held at Colorado State University, October 27 to 31, 1969.

I will plan to be in attendance during the entire time the Institute is in session.

I understand that participants will receive a stipend of $75 for the week and that travel allowance will cover much if not all of air travel (at air tourist rate) within the continental limits of the United States on a pro rata basis if full reimbursement cannot be made with the funds provided for the Institute.

I am interested in the following Task Force Subjects for discussion, research, and reporting (Number first choice with 1; second choice with 2 and third chioce with 3). Circle the number of topic on which you would be willing to serve as a discussion leaders.

____ 1. Organizational structure for systematic facility and equipment planning.
____ 2. Codes, standards, and specifications for facilities and equipment.
____ 3. Planning for physically handicapped and other special needs.
____ 4. Role of architect and specialists in planning facilities and equipment.
____ 5. Site selection and development.
____ 6. Development of the educational specifications for facilities and equipment.
____ 7. Media and equipment for occupational education.
____ 8. Innovations and emerging concepts in planning facilities.

COMMENTS OR QUESTIONS:

Signed: ______________________________
Street Address: ______________________________
State: ____________________ Zip: __________
Home Telephone No.: ____________________ Office No.: ______

COLORADO STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION
FORT COLLINS, COLORADO

FACILITIES INSTITUTE
DR. MILTON E. LARSON, DIRECTOR

## INFORMATION SHEET NUMBER I

May I suggest that you retain this information sheet as a number of the details relative to the Institute are referred to.

**REGISTRATION FOR CREDIT:** If you desire to register for credit, please complete the enclosed Special Registration form and return to me by October 15. Individuals desiring credit will complete and return by November 21 an additional written assignment. This will be approximately the equivalent of a term paper. Once a commitment is made you will be expected to adhere to it. No additional cost is made for registration for credit.

**COMPLETION OF SPECIAL REGISTRATION APPLICATION:** Please complete the form carefully filling in all blanks and spaces required. Note the following course information to be inserted.

(1) If you are taking the institute for undergraduate credit:

COURSE NUMBER: VE 495f
COURSE TITLE: Special Studies in Voc-Tech. Ed.
CREDITS: 3
LOCATION: Fort Collins

(2) If you are taking the institute for graduate credit:

COURSE NUMBER: VE 795f
COURSE TITLE: Special Studies in Voc-Tech. Ed.
CREDITS: 3
LOCATION: Fort Collins

NOTE: You need not complete any of the other items in this block.

**HOUSING:** Participants and their families will be housed in Newsom Hall. No other reservations need be made other than the return of the form attached. Complete details of cost and accommodations are included in the brochure. See brochure included. (If you desire a study lamp, you will need to bring it; linens and betting are provided). Fees are payable at the time of registration.

**TRAVEL BY AIR:** If you are planning to travel by air, schedule a flight to Denver Stapleton Airport. Plan to arrive at Stapleton between the hours of 10:00 A.M. and 4:00 P.M. on Sunday, October 26. We will have a representative stationed in the area close to the baggage pickup to make arrangements for you to continue your drive to Colorado State University at Fort Collins in Private Cars. The charge for this service will be $3.50 per person. Indicate on the form the number in party to better plan adequate service for participants.

This service will be provided only from Denver Stapleton Airport, DO NOT schedule your flight to Cheyenne, Wyoming if you desire to participate in above service.

TRAVEL BY CAR: Interstate Number 25 to Fort Collins via either Denver or Cheyenne is the preferred route to travel. Enter the city of Fort Collins, proceed to College Avenue, turn on Pitkin Street and continue along the periphery of the Colorado State University Campus to Newsom Hall located close to the intersection of Pitkin Street and Meridian Avenue.

SESSIONS: All sessions will be held in the STUDENT CENTER BUILDING beginning Monday at 8:00 a.m. General sessions will be held in Room 228.

INSTITUTE REGISTRATION AND RECEPTION: All individuals should plan to arrive Sunday afternoon. Registration for the Institute will be in the Lounge of Newsom Hall between the hours of 1 and 7 p.m. Reception in Newsom Hall 8 - 9 p.m. Buffet luncheon will be served in Newsom Hall between the hours of 5 and 7.

LITERATURE: Should you have books, pamphlets or other literature dealing with the topics you suggested interest in for the group meetings, it will be helpful if you bring a few of the most important for reference during and after the small group sessions.

RETURN FORM: Complete and return the Information Form together with the Special Registration (If you desire credit return the Information Form only.

COLORADO STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION
FORT COLLINS, COLORADO

FACILITIES INSTITUTE
DR. MILTON E. LARSON,
DIRECTOR

## SMALL GROUP WORKSHOP SESSIONS

PURPOSE: It is the purpose of these sessions to produce an additional impact for the benefit of participants. Each member of the group is asked to give consideration to the topic assigned. An additional benefit will accrue to the readers of the report who will have the opportunity to gain from the input of the participants.

ORGANIZATION: Each group will have a chairman and a secretary. The chairman will preside and serve as the conference leader. He will introduce the topic and guide the direction of the discussion. The secretary will take notes and prepare a 10-minute report to be given to the total group. A written report will be turned into Dr. Larson which will be incorporated into the final report of the Institute. (Please complete and turn this in prior to departure.)

APPROACH: View the topic from the point of view of a person faced with responsibilities for development of an institution for a comprehensive vocational education program.

Each group will discuss the following and other subjects significant for the stated topic:

I. What should a person planning a new institution consider relative to the topic? (List or outline)

II. Explain the relationship of this topic to the total planning process.

III. Identify and discuss the elements relative to the topic that should be included in a planning guide. Do you favor having a state guide? A national guide?

IV. What problems should facilities planner recognize relative to this topic?

V. What is the relationship to educational effectiveness of institution of cost, public acceptance, image of vocational education, etc.

VI. List other recommendations helpful to individuals planning facilities.

VII. List sources of information, aids, etc.

VIII. Other helps for individual planning facilities on this topic.

MATERIALS: If you have reference materials helpful in relation to the above, you may wish to bring along selected references as aids for the group.

SECRETARIES' REPORT: The written report needs to identify the:

I. Topic

II. Name of chairman, secretary, and participants

III. Important elements of the topic discussed in paragraph form, outline and/or listing of items. Introductory paragraph with final summary may be incorporated together with outline. (The report needs to be meaningful to readers of the report.)

COLORADO STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION

FACILITIES INSTITUTE
1969

## EXPENSE FORM INFORMATION FOR PARTICIPANT

1. Reimbursement will be on the basis of air tourist rate, tax exempt (or equivalent if driving own car). If the total costs of travel do not permit full reimbursement, a pro rata basis of cost of air tourist fare will be made. Show actual cost of air tourist if driving your own automobile.
2. Attach receipt or last page of your ticket. If driving, attach a statement of air fare (tax exempt).
3. Sign your expense form.
4. Do not list on this form other expenses, such as ground travel, food or lodging.
5. You will be presented a separate check for the stipend of $75.00.
6. Complete and return immediately to:

Dr. Milton E. Larson, Director
Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

# APPENDIX E

# INSTITUTE CHECK AND POST_CHECK FORM

COLORADO STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION

## INSTITUTE CHECK FORM

DIRECTIONS:

Read each statement carefully and decide how you feel about it. You will agree with some statements and disagree with others. You are offered five possible answers to each statement. The "undecided" answer should be circled only when you have no opinion. Circle one number following each statement. PLEASE ANSWER ALL STATEMENTS.

| Example: | Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| The city needs to improve garbage collection . . . . . . | 5 | 4 | 3 | 2 | 1 |

This person feels in no uncertain terms that garbage collection schedules are inadequate.

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| A. I FEEL THAT: | Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 1. The purposes of this Institute were clear to me . . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 2. The objectives of this Institute were not realistic. . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 3. Specific purposes made it easy to work efficiently. . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 4. The participants accepted the purpose of this Institute . . . . . | 5 | 4 | 3 | 2 | 1 |
| 5. The objectives of this Institute were not the same as my objectives. . | 5 | 4 | 3 | 2 | 1 |
| 6. I didn't learn anything new. . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 7. The material presented was valuable to me . . . | 5 | 4 | 3 | 2 | 1 |

|  | Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 8. I could have learned as much by reading a book. . | 5 | 4 | 3 | 2 | 1 |
| 9. Possible solutions to my problems were considered. | 5 | 4 | 3 | 2 | 1 |
| 10. The information presented was too elementary. . . . | 5 | 4 | 3 | 2 | 1 |
| 11. The speakers really knew their subjects . . . | 5 | 4 | 3 | 2 | 1 |
| 12. The discussion leaders were well prepared. . . . | 5 | 4 | 3 | 2 | 1 |
| 13. I was stimulated to think about the topics presented . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 14. New acquaintances were made which will help in the future. . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 15. We worked together well as a group. . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 16. We did not relate theory to practice . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 17. The sessions followed a logical pattern . . . . . | 5 | 4 | 3 | 2 | 1 |
| 18. The schedule was too fixed . . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 19. The group discussions were excellent. . . . . . | 5 | 4 | 3 | 2 | 1 |
| 20. There was very little time for informal conversation. . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 21. I did not have an opportunity to express my ideas. . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 22. I really felt a part of this group. . . . . . . . | 5 | 4 | 3 | 2 | 1 |

| | Strongly Agree | Agree | Undecided | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 23. My time was well spent . | 5 | 4 | 3 | 2 | 1 |
| 24. The Institute met my expectations . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 25. I have no guide for future action. . . . . . | 5 | 4 | 3 | 2 | 1 |
| 26. Too much time was devoted to trivial matters. . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 27. The information presented was too advanced . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 28. The content presented was applicable . . . . . | 5 | 4 | 3 | 2 | 1 |
| 29. Institutes such as this should be offered again in future years. . . . . | 5 | 4 | 3 | 2 | 1 |
| 30. Institutes such as this will contribute little to occupational education. . . . . . . . | 5 | 4 | 3 | 2 | 1 |

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B. How do you plan to apply the outcomes you have obtained from attending this institute (Number 1, 2, 3, 4, 5, and 6 in order of importance with Number 1 being the most important.)

_____ 1. Writing an article or other publication

_____ 2. Planning meetings for vocational educators in my area on the subject

_____ 3. Stimulating more thought and discussion on this topic

_____ 4. More careful reviews of existing facilities and equipment

_____ 5. Building a closer link with industry, business, and agriculture

_____ 6. Other: (List) ______________________________

______________________________

C. In the space below indicate any suggestions you may have for increasing the applications of knowledge gained at this Institute.

D. Indicate below the areas of subject-matter content which you feel should be included in future Institutes.

E. What were the strong points of this Institute as you see it?

F. What were the weak points of this Institute as you see it?

G. Other Comments (Use back of this sheet if needed.)

COLORADO STATE UNIVERSITY POST INSTITUTE CHECK FORM
DEPARTMENT OF VOCATIONAL EDUCATION

This form is an important tool designed to provide feed-back after an interval of time following the institute to appraise the degree of utilization and application by institute participants of concepts, processes, and materials of the isntitute.

PLEASE COMPLETE AND RETURN THE FORM AT YOUR EARLIEST CONVENIENCE WITHIN THE NEXT TEN DAYS

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## Part I

Circle the number following each statement to indicate the degree of value of your present position of the concepts, processes, and materials of the institute. If the institute had no value for a particular statement circle "1", if a very high degree of value circle "5". Estimate values between the 5-point scale given

| INFORMATION GAINED AT THE INSTITUTE HAS HELPED ME: | Highest | | | | None |
|---|---|---|---|---|---|
| | - circle | | your response | | - |
| 1. In helping plan facilities. . . . | 5 | 4 | 3 | 2 | 1 |
| 2. In helping others to plan facilities. . . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 3. In selecting equipment. . . . . . | 5 | 4 | 3 | 2 | 1 |
| 4. In helping others select equipment . . . . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 5. In understanding better trends in facilities . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 6. In planning workshops on facilities. . . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 7. In teaching others about facilities. . . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 8. In construction of educational specifications. . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 9. In teaching others to better construct educational specifications. . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 10. In evaluating proposed plans for facilities | 5 | 4 | 3 | 2 | 1 |

| | Highest | | | | None |
|---|---|---|---|---|---|
| 11. In planning the structure for facilities planning. . . . . . | 5 | 4 | 3 | 2 | 1 |
| 12. In writing articles on facilities and equipment . . . | 5 | 4 | 3 | 2 | 1 |
| 13. In planning programs for facilities and equipment improvement. . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 14. In writing proposals for funding facilities project . . | 5 | 4 | 3 | 2 | 1 |
| 15. To build a closer link with industry, business, and/or agriculture. . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 16. To apply concepts of the "pert" process . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 17. In my research activities. . . | 5 | 4 | 3 | 2 | 1 |
| 18. Writing articles or other written materials. . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 19. In preparation of speeches . . | 5 | 4 | 3 | 2 | 1 |
| 20. By providing a useful administrative tool. . . . . . | 5 | 4 | 3 | 2 | 1 |
| 21. Through new insights and approaches to some of the problems of vocational education. . . . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 22. In conveying the concepts and understanding of vocational education to the public. . . . | 5 | 4 | 3 | 2 | 1 |
| 23. In working more effectively with other educators . . . . . | 5 | 4 | 3 | 2 | 1 |
| 24. By providing a guide for future action. . . . . . . . . | 5 | 4 | 3 | 2 | 1 |
| 25. To stimulate others to improve instructional program. . . . . | 5 | 4 | 3 | 2 | 1 |

## Part II

CIRCLE YOUR RESPONSE

YES NO UNCERTAIN

26. If you were presented the opportunity to attend a more advanced institute focused on facilities and equipment would you be interested in attending such an institute under conditions similar to those for this institute?

27. Would you recommend to your friends in vocational education attendance of such an institute if the opportunity were made available to them? YES NO UNCERTAIN

## Part III

28. If you have developed any materials for yourself or other employing concepts, procedures, or practices advanced by the institute, I would welcome receiving copies of these materials.

29. As you reflect back to the institute, list comments which you feel would strengthen the institute.

30. Other comments:

# APPENDIX F

## ILLUSTRATIONS OF PARTICIPANTS' LETTERS RELATIVE TO INSTITUTE

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STATE OF WISCONSIN

BOARD OF VOCATIONAL, TECHNICAL AND ADULT EDUCATION

C. L. Greiber
Director
137 East Wilson Street
Madison, Wisconsin 53703

November 10, 1969

President A. R. Chamberlain
Colorado State University
Fort Collins, Colorado

Dear President Chamberlain:

I was privileged to attend the institute "Planning Facilities for Comprehensive Vocational Education Programs for the Future" on your fine campus at Colorado State University. I wish to take this opportunity to thank you kindly for sponsoring this institute and making the fine facilities of Colorado State University available to those in attendance.

Your Dr. Milton E. Larson, Institute Director, did an excellent job in the overall and detail planning of this institute. Under Dr. Larson's direction the selection of program topics and the selection of outstanding national speakers did so much to make this institute the best that we have been privileged to attend.

Those of us from Wisconsin working in the facilities development field wish to thank you very kindly for sponsoring this institute.

Sincerely,

H. J. Schantz
State Supervisor of Facilities

HJS/skh

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OKLAHOMA STATE DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

Francis T. Tuttle, Director    1515 West 6th Avenue    Stillwater, Oklahoma 74074

February 10, 1970

Dr. Milton E. Larson
Professor of Vocational Education
and Director, Facilities Institute
Colorado State University
Fort Collins, Colorado 80521

Dear Doctor Larson:

Enclosed is my evaluation form for the Facilities Institute conducted at Colorado State University.

Again This was one of the best planned conferences that I have ever attended.

Yours very truly,

Byrle Killian
Assistant State Director
Vocational and Technical
Education

BK/bjs

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LORAIN COUNTY JOINT VOCATIONAL SCHOOL
309 West Lorain Street
Oberlin, Ohio 44074

Telephone: 216 774-1034

William R. Burton, Superintendent

February 9, 1970

Dr. Milton E. Larson
Colorado State University
Department of Vocational Education
Fort Collins, Colorado 80521

Dear Dr. Larson:

Please find enclosed my post institute check form.

I found this conference to be exciting and worthwhile. Our District will have a direct benefit as a result of this institute, due to the fact we are planning many of our vocational areas around the information I received at this workshop.

I would be most interested in attending another institute in the future. Please advise me of any forthcoming institutes.

Please note my new address:

Mr. William R. Burton, Superintendent
Lorain County Joint Vocational School
R. D. 1, Route 58 South
Oberlin, Ohio 44074

Thank you.

Sincerely,

William R. Burton
Superintendent

WRB/bl

Participating School Districts: Amherst - Firelands - Keystone -
Oberlin - Wellington

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STATE IF HAWAII

Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

Office of Business Services

November 6, 1969

Mr. Milton E. Larson
Director, Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

Dear Mr. Larson:

May I take this means to express my sincere gratitude for the privilege which was mine to attend the Facilities Institute at C.S.U.

I wish to commend you on the very fine program structuring of the Institute and your ability to obtain top flight speakers for the various sessions. I was also deeply impressed with the fine facilities where the meetings were held and the well coordinated manner in which the sessions were conducted.

I hope it will be possible for me to receive the print out of Mr. Mike Russo's two addresses:

1. The challenge for Better Planning

2. Trends and New Directions in Planning Facilities.

I sincerely hope it will be possible for me to attend future seminars like the one you conducted at C.S.U.

Sincerely,

James T. Okamura, Director
Facilities & Auxiliary Services Branch

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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF EDUCATION
Roger Williams Building
Hayes Street, Providence, R. I. 02908

William P. Robinson, Jr.
Commissioner

November third
1969

Dr. Milton E. Larson, Director
Facilities Institute
Colorado State University
Department of Vocational Education
Fort Collins, Colorado 80521

Dear Dr. Larson:

Returning from Colorado Saturday has given me ample opportunity to reflect on the Conference you directed. I found it to be one of the most stimulating and though provoking programs that I have ever participated in, and one from which I am sure a great deal of benefit will be derived.

As you well know, the Facilities at Colorado State University are excellent and the staff that served us from the Conference Services Center was extremely helpful.

Besides the Conference itself, I was most impressed by the quality of the young ladies and gentlemen attending the University. When one is used to seeing Hippies, Yippies and whatever else exist in the Eastern Colleges, it is indeed refreshing to meet the young people who are not only concerning themselves with the problems which face most of us, i.e. the blacks, the migrant worker, Viet Nam, etc., but are also directly concerned with getting an education.

I am presently meeting with the architectural firm of Maguire Associates whiuh is engaged in completing architectural plans for an area vocational facility in Warwick, Rhode Island. I am sure many of the ideas expounded at the Conference will be found in the Warwick School; and when complete, I would be more than happy to send you a resume and pictures of this facility if you desire.

Let me again thank you very much for a most enjoyable and informative week with you in Colorado.

Sincerely,

John J. Gunson, Jr.
Consultant, Technical Education

JJG/laf

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MARYLAND STATE DEPARTMENT OF EDUCATION
600 Wyndhurst Avenue, Baltimore 21210

November 6, 1969

James A. Sensenbaugh
State Superintendnet

Dr. Milton E. Larson
Institute Director
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Larson:

The recent institute that I attended at the university on planning facilities and equipment was the best organized and most informative institute that I have attended during my educational career. The planning showed great concern and flexibility for persons attending from all parts of the country.

The information received at this institute gave good directions in planning vocational facilities in the future throughout the country. I expect to use the knowledge I gained at this institute to help Maryland develop the best possible vocational facilities for the future.

The U. S. Office of Education should feel proud that they have invested money in this particular institute and it should be equally proud that it was directed by such an able educator as yourself.

I want to take this opportunity to tahnk you again for inviting me to attend the institute.

Sincerely yours,

Lawrence H. Custis, Supervisor
Industrial Training

LHC/cs

CC: Mr. Michael Russo, Chief of the Planning and Evaluation Branch
Mr. Jack A. Wilson, Project Officer

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THE UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68508

Teachers College
Department of
Educational Administration

November 4, 1969

Dr. Milton E. Larson, Director
Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Larson:

Just a note to express my pleasure and appreciation for the association which we had at the recent Institute on Facility Planning for Vocational Education at Colorado State University in Fort Collins.

I want to say again, that this was one of the best scheduled and conducted Institutes I have ever attended, and I was certainly pleased to be present and have a part in the program. For the most part the speakers were of a high caliber and presented a variety of points of view. The group was serious and hard working and we accomplished a great deal in the time we were in session.

It has been a real pleasure to be associated with you in this Institute and I shall look forward to visiting with you again at the first opportunity.

Sincerely,

David Hutcheson
Associate Professor

DH:jo

C Board of Education
O INGHAM INTERMEDIATE SCHOOL DISTRICT
P 147 West Maple Street Mason, Michigan 48854
Y Area Code 517 677-3481

November 4, 1969

Dr. Milton E. Larson
Department of Vocational Education
Colorado State University
Fort Collins, Colorado

Dear Dr. Larson:

I would like to thank you for including myself and Mr. William Kane to the conference on Planning Facilities and Equipment for Comprehensive Vocational Education Programs for the Future.

This conference was the best organized, best run, best to keep on schedule and to the point, and the best over all speakers of any conference I have ever attended. This conference was extremely helpful to me as it furnished guidance and direction for our plans for the new Capitol Area Career Center in Michigan. A copy of our objectives and concepts for our center is attached.

With the help of this conference, we will move ahead with our plans and hope to build one of the most innovated cneters in the country.

You are to be congratulated for the leadership and organizational abilities you displayed. I came away from this conference greatly enriched with ideas for our center. If you are ever in Michigan, please take the time to visit us and in two years we hope to display an area center for everyone to look at and yet be a leader in educating students.

Sincerely,

Leo Schuch
Vocational Consultant

LS/ab

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ARIZONA STATE UNIVERSITY
Division of Technology
Tempe, Arizona 85281

November 5, 1969

Dr. Milton Larson
Department of Vocational Education
College of Humanities and Social Science
Colorado State University
Fort Collins, Colorado

Dear Dr. Larson:

The work tends to pile up while one is away from the office but the extra work certainly is worth the effort spending a very worthwhile week in the Facilities and Equipment Planning Institute.

I want to compliment you on the excellent organization and as a whole on the speakers for the institute. I know that a great deal went into the planning of this undertaking.

I am very thankful for your allowing me to be a participant in the institute. Much of the information will assist me in setting guidelines for Facilities Planning for publication from the State Department.

Again, thanks.

Sincerely,

Z. A. Prust
Associate Professor

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STATE OF MICHIGAN
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
Box 298, Lansing, Michigan 48904

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November 14, 1969

Dr. Milton E. Larson, Director
Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Larson:

I was extremely impressed with the 1969 Facilities Institute. It was an exhilarating experience to attend this conference. The enthusiasm on behalf of the speakers was truly inspiring. I felt the program was very well planned and informative.

Enclosed please find the Travel Expense Account Sheet containing my travel expense information.

Thank you very much.

Sincerely,

Philip T. Bailey
Area Program consultant

PTB/eeg

Enclosure

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AREA VOCATIONAL, TECHNICAL AND ADULT EDUCATION DISTRICT 14
Wood County Court House, Room 224 Wisconsin Rapids, Wisconsin
Earl F. Jaeger, District Director 715-423-3000 Ext. 157

November 13, 1969

Dr. Milton E. Larson, Director
Facilities Institute
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Larson:

I am indeed very sorry that I've delayed sending the attached expense form to you until this date. A death in our family prevented me from getting the documented evidence of the cost of air travel until today.

Attached is the expense form and signed statement of air fare (tax exempt) from the travel agency, Travel Shop, located in Wisconsin Rapids. I sincerely hope that this documentation is sufficient to award reimbursement for travel to and from the Facilities Institute. I might indicate that the round trip by car was approximately 2200 miles.

May I extend my congratulations to you for an extremely well run institute. I am sure that all of us have not only benefitted from the content of the institute but from the organizational structure and conduct of the various sessions as well.

Thank you.

Very Truly yours,

Earl F. Jaeger
District Director

AREA BOARD OF VOCATIONAL, TECHNICAL AND ADULT EDUCATION DISTRICT 14
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THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department
Albany, New York 12224

November 6, 1969

Mr. Dennis
Program Planning & Development
Division of Vocational and Technical Education
U. S. Office of Education
Washington, D. C. 20202

Dear Mr. Dennis:

Now that the institute is over I'm back at my desk and have had a few minutes to collect my thoughts and do the things I should. During conversation with you last week, you indicated that you would like to be advised of facilities which have been or are being planned with "open-areas" for vocational programs.

The following represents this afore-mentioned type of facility and other information pertinent to the design and administration of the project.

1a) Broome-Tioga Occupational Center
R.D. 5 Binghamton, N.Y. 13905

Working Drawing stage

c) Dist.-Supt. - Hiram Goodrich
3116 Lawndale Street, Endwell, N.Y.

d) Director - Harold Baxter
51 Main Street
Johnson City, New York
(607-797-2379)

2a) Cattaraugus Co., So. Area Occupational Center, Windfall Road
Olean, New York

b) Working Drawing stage

c) Dist. Supt. - Paul W. Haley
124 Main St., Little Valley, N.Y.
(716-938-3441) 14755

d) Director - William
O-Connell, 430 North 7th St.
Olean, New York
(716 - 373-1690)

3a) Oswego Co. Area Center, County
Home Road, Pulaski, N. Y.

b) In construction

c) Dist. Supt. - Wendell H. Simpson
South Jefferson St., Pulaski, N.Y.
13142 (315-298-5189)

d) Director - Richard Sheldon
Box 488, Mexico, N. Y.
13114 (315-668-2056)

4a) Lewis A. Wilson Tech. Center
Westminster Ave., R.D. 3
Huntington, New York

b) Part complete - part in construction

c) Dist. Supt. - Dr. Gordon A. Wheaton
507 Deer Park Road, Dix Hills
Huntington, N.Y. 11746
(516-427-4200)

d) Director - John Grimes
Dix Hills, Huntington,
New York 11743
(516-427-4200)

4a) Westchester #1 BOCES Regional Center
Yorktown Heights, N. Y.

b) Working drawing stage

c) Dist. Supt. - Noble Gividen (Dr.)
42 Triangle Center, Yorktown
Heights, N.Y. 10589
(914-24502700)

d) Director - Patrick Carlo
845 Fox Meadow Road,
Yorktown Heights, N.Y.
10598 - (914-245-2700)

I recognize that this offers very little in the way of "on-site" visitation possibilities at this time, but in the near future, should give potential guests an excellent opportunity to observe various approaches to "open-planning" actually functioning. I know that the district superintendents will be happy to hear from you and will be most cooperative in discussing with you their plans for their area center. Don't hesitate to contact them and most certainly, feel free to mention that I suggested you communicate with them.

I trust this information has served you in some positive way. My thanks to you and your superiors who made it possible to attend the institute.

Sincerely,

Charles J. Poskanzer
Associate Educator

CJP:gms

cc: Dr. Milton E. Larson
Department of Vocational Education
Colorado State University
Fort Collins, Colorado 80521